MEMORANDUM

INTERMOUNTAIN POWER SERVICE CORPORATION

TO: George W. Cross

FROM: Dennis K. Killian

DATE: April 10, 2006

SUBJECT: Response to Condition of Unit 2 Burners

It is obvious after seeing the state of the Unit 2 burners that we need a plan for their future repair or replacement. Right now, we are documenting the damage to each of the burners with pictures and drawings to use in the design review process or for legal recourse reasons. We will also send out a burner tip for metallurgical and failure analysis.

The weaknesses of the ABT burners seem to be with erosion around the diffuser and at the tip and with structural failure (possibly thermal stresses) at the tip. What we are doing with the diffuser should solve the erosion in the burner barrel for now but, we still have doubts about the long term. The add-on falsies will buy us time with the tip erosion but, they do nothing to solve the inherent design flaw that allows such rapid erosion. We will replace nozzles too broken to install the falsies with straight nozzles similar to what is on Unit 1. We believe these repairs will allow us to operate safely for another two years.

We learned from the review of the B&W burners that even B&W did not respect the amount of radiant heat on burners that large. It took a finite element analysis from an outside consultant we hired for them to incorporate the necessary design changes in the second iteration of Unit 1 burners that have allowed them to operate this long. We may need to do the same thing with the ABT burners.

If nothing else, it might be possible to incorporate the strengths of both the B&W burners and the ABT burners in our own hybrid design. It appears possible to install the B&W conical diffuser, ceramic lined barrel, and stainless steel straight tip with the ABT registers. We would probably lose some of the NO_x reduction but, with the Unit 2 OFA we should still be able to meet the current WEPCO limits. They should work about the same as the current burners on Unit 1.

Before we go that direction, we should give ABT a chance to review their design and make it right with us. However, we need to be careful to not become a research facility for ABT. It is obvious they do not understand long sweep elbows or burners this large.

We might also want to look at other combustion staging tips available from some of the other after market suppliers or from B&W.

Since we will be budgeting for the next Unit 2 outage this summer, we should have a plan together by July or August.

Based on past experience, I think it is very unlikely that ABT would pay for all or any of the repair or modification costs without legal action. If legal action is pursued, the contract states that "No component shall last less than four (4) years before requiring rebuild, restoration, or replacement." The guarantee that they supplied us with their proposal and that was made part of the contract (Division C2 of Contract) actually stated a 6-8 year guarantee for the life of the nozzle. Those parts of the contract are very plain and clear and should give us a solid footing to pursue legal recourse.

For their defense they would probably use the velocity numbers that we gave them in an email to say that they designed for a lower coal flow velocity than what is currently on Unit 2. We would counter that by saying they should have done their own velocity calculations based on the stoichiometry and BTU throughput we had in the contract and that the numbers we supplied were only intended to verify that their calculations were comparable to our actual operating experience. It would improve our legal position if we can prove through finite element analysis that the nozzles are failing from thermal stresses.

ABT is not a large company (see attached Dun & Bradstreet Report) with only 14 employees and very few tangible assets (leased 3,200 square foot facility). However, their contract required Professional Liability insurance with a $2,500,000 limit which might provide enough promise of return to make a lawsuit worthwhile.

We will prepare a letter to ABT notifying them of the failures and putting them on official notice that we are holding them financially responsible for providing and install the necessary reparations in the future. While we are shooting for the moon, we should also ask for reimbursement for the F3 burner we purchased and for the repair parts we are installing this outage.

In the meantime, we will proceed with our own design review and failure analysis as if everything depends on us, because in reality it probably will.

If you have any further questions concerning this matter, please contact Jerry Hintze at extension 6460.

JKH:jmj

Attachments

cc: Mike Alley
Will Lovell
Dean Wood
Garry Christensen
Aaron Nissen
Phil Hailes
Nancy Bennett

April 24, 2006

Mr. Joel Vatsky
Advanced Burner Technologies
P.O. Box 410
271 Route 202/206
Pluckemin, NJ 07978

Dear Mr. Vatsky:

Request for Repair of Intermountain Generating Station Unit 2 Burners

In March 2004, we installed 48 of your Opti-Flow Low NO_X Burners in Unit 2 at the Intermountain Generating Station under Contract 45606. Since that time, we have experienced numerous problems with the burners. Among the most important identified to date are the following:

1. Erosion of the burner barrel just downstream of the long-sweep elbow. This has occurred on every burner and we believe it is caused by the diffuser assembly you designed and supplied that is located in the elbow.

2. Erosion of the burner nozzles where it divides into the six segments just prior to discharge. Every burner showed significant erosion with many having multiple holes.

3. Severe cracking and structural failure of the burner nozzle which originates from the weld of the nozzle to the burner barrel. The cracking of the nozzles was so severe on 15 of the 48 burners on a recent inspection that those 15 nozzles had to be removed and replaced.

4. Erosion of the ceramic lined long-sweep elbow and X-vane diffuser.

5. One burner (F3), was completely replaced because it was damaged in a burner fire on June 25, 2005. After inspecting the damaged burner, we believe the fire was caused by a hole eroded in the burner barrel just after the elbow. We believe the hole allowed coal to enter the inner air sleeve and eventually catch on fire damaging the burner.

The contract you signed with us on September 12, 2003 contained several clauses pertaining to the failures that we have experienced. For example, Division F2, Article 5, Paragraph "g" states:

> *"Experience based and verified wear-life shall be quoted within the bid for all burner components. No component shall last less than four (4) years before requiring rebuild, restoration, or replacement."*

Also, Division F2, Article 5, Paragraph "f" states:

> *"The burner assemblies shall be fabricated of quality material sufficient to withstand the significant thermal stresses occurring within the windbox as a result of both radiant and convective heating. Any deformation causing malfunction of register assemblies or misdirection of flow through the burner within the period of guaranteed operability shall be repaired at the earliest possible opportunity and charged to Contractor."*

Due to the need for continued operation of IGS Unit 2, we have purchased the materials necessary to temporarily repair the burners. However; we are now requesting the following remedial actions from ABT according to the terms of the contract:

1. With no additional IPSC reimbursement, ABT should make the necessary modifications to their design to solve all of the problems we have experienced with the burners as outlined in this letter and to otherwise meet all of the specifications of the contract.

2. With no additional IPSC reimbursement, ABT should supply the necessary materials and manpower to install those design changes on all 48 of the IGS Unit 2 burners. This work should be done on the next Unit 2 major outage scheduled for the spring of 2008.

3. ABT should reimburse IPSC for the burner purchased to replace the fire-damaged F3 burner. We believe the fire was the direct result of an ABT design flaw that allowed rapid erosion of the burner barrel.

4. ABT should reimburse IPSC for the materials purchased from ABT to repair the burners during our April 2006 Unit 2 outage.

If you have any questions concerning this matter, please contact Jerry Hintze at (435) 864-6460.

Sincerely,

George W. Cross
President and Chief Operations Officer

JKH:jmj

cc: Garry Christensen
Phil Hailes
Will Lovell
Mike Alley
Robert Rees
Nancy Bennett

History of Burner Replacement at IGS

Year	Unit 1	Unit 2
1986 & 1987	Initial operation with the original B&W Low NOx (DRB) Dual Register Burners installed with initial construction	Initial operation with the original B&W Low NOx (DRB) Dual Register Burners installed with initial construction
1991 & 1992	New burners installed. Same DRB low NOx design, structural modifications to the backplate and registers to prevent warping from overheating. Flame stabilizers installed to shade the burner front from radiant heat. Overheating was the result of design flaws from B&W.	Repaired and modified the burners. Structural modifications to the backplate and registers to prevent warping from overheating. Flame stabilizers installed to shade the burner front from radiant heat
2004		New burners installed due to structural failures from overheating. Advanced Burner Technologies (ABT) low NOx burners installed. Unit 2 failed before Unit 1 because Unit 2's were not replaced in 1992 like was done on Unit 1.
2007	Anticipated replacement of the Unit 1 burners due to structural failures.	

Coordinating Committee Items
February 26, 2003

Unit Load Increase Status for Unit 1
All of the projects necessary to allow Unit 1 to go to 950 Mwgross are on schedule and we should be able to go to that load following the outage in order to complete the post outage testing requested by the State. The status of the individual projects are as follows:

Helper Cooling Tower
The structural erection of the helper cooling tower is on schedule for completion by the end of March. All of the structural supports, spray headers and laterals have been installed and only the mechanical equipment and siding remains. During the Unit 2 outage, the circulating water tie-in was also completed. The contract for installation of the electrical equipment and wiring has been awarded to GSL Electric from Sandy, Utah and they are just starting to arrive on-site to start the work. The will probably complete their work in early to mid-May which will be just in time to put the tower in service for the summer hot weather.

Transformer and Isophase Bus Duct Modifications
During the spring outage on Unit 1 the main step-up transformer cooling sections will be replaced with larger units to increase the cooling capacity. The coolers were purchased from Weidman ATIC and will be installed by Wasatch Electric. At the same time, we will installing a new section of isophase bus duct from the transformer to just inside the building. This new section will allow air to flow from a fan inside the unit to the transformer bushings. The air will be cool the bus duct and the transformer bushings at the new higher load.

HP Turbine Section Replacement
The HP turbine for Unit 1 is on-site and ready for installation during the outage. The Alstom Technical Representative is also here and everything seems to be ready for the work to begin.

Boiler Overfire Air and Platen Extensions
TEI, the contractor who will be installing the boiler modifications necessary for the Unit uprate, has arrived on-site with their material and equipment and have started the work. Prior to the outage, they relocated some bracing that was in the way of the ducting and completed as much of the duct work as possible. TEI has subcontracted with Safeway Scaffolding to install the boiler scaffolding. At this point, TEI is performing according to schedule and the overfire air system and platens should be available by the end of the outage. Just prior to the outage, we received the modeling results from GE-EER and it verified the Babcock Power's design should work as they have predicted. We hired GE-EER as an independent check of the design.

Maintenance Activities

Unit 2 Circulating Water Line Non-Destructive Testing

Two weeks prior to the Unit 2 outage, the circulating water line was uncovered in the area of the tie-in for the helper cooling tower. In the process of uncovering the line, the pipe was bumped with a shovel and large sections of the mortar covering on the pipe sloughed off indicating failure of the wire prestressing bands and delamination of the mortar coating. This gave us concerns for the structural integrity of the entire circulating water line. We investigated the methods for testing the line and we found a company out of Scottsdale, Arizona, Pressure Piping Inspection Company (PPIC) that specializes in testing of prestressed concrete pipe. They use a patented induced eddy current test that can monitor the condition of the prestressing wires without damaging the pipe. We hired them to test the Unit 2 pipe while it was down for the short outage and their preliminary results indicate large areas of failure in the return line from the condensers to the cooling towers. Some repairs were made on Unit 2 in the area of the tie-in that was excavated but, we did not have enough time during the short outage to excavate any other areas. A full report from PPIC will be received within six weeks and that report will indicate exactly which sections of pipe are failed and where on the pipe the failures have occurred. We will then use that data to try and determine why we have failures and the best methods for remedying the problem.

Aaron,

Status of the budget is something we should not address at this time. All of the numbers are so skewed by the outage that it would be just confusion until the outage is over.

Coordinating Committee Items
7/2003 Through 10/2003

Helper Cooling Towers Placed In-Service

The helper cooling towers on both units were placed into service and an immediate decrease in turbine backpressure of approximately 0.5 inches of mercury was noted. The towers were placed into service just in time to help us through the hottest July in Utah recorded history. This reduction in backpressure will not only help the units stay on-line, it will reduce the plant heat rate through-out the year. The towers appear to be performing as expected.

Generator Monitoring System

The generator monitoring systems installed on both units during the spring outages were placed into service. The monitoring systems were supplied by GE and go by the acronym SLMS which means Stator Leak Monitoring System. SLIMS works by monitoring the gas flow from the generator looking at both the quantity of gas and the hydrogen content. If the mass flow increases along with the hydrogen content, then an alarm is sent to the control room indicating a possible stator leak. These monitors were installed as part of the uprate project to insure the reliability of the generator at the higher loads.

Unit 2 Burner Contract

Early on in the project, a problem was noted with the burners on both units that caused them to overheat and deform. At that time, the Unit 1 burners were so bad that they were completely replaced with a new design while the Unit 2 burners were just repaired and modified. The Unit 2 burners are at the point now where they also need to be replaced and funds were placed on this years budget for that purpose. A contract has been prepared and bids received for these new burners. The contract will be awarded to Advanced Burner Technologies (ABT) from New Jersey. ABT specializes in after market burners and has a proven track record in large coal boilers. Bonanza power plant in Vernal, Utah, installed ABT Low NOx burners in their unit several years ago and noticed a significant reduction in NOx emissions while maintaining good performance. The new burners will be installed during the outage next spring.

Induced Fan Variable Speed Drives

The existing ID fan variable speed drives are failing at an increasing rate and parts are becoming more difficult to obtain. We are planning to replace the drives over a five year period and use the removed parts to keep the operating systems in service. The specifications for the ID fan drives were prepared with the assistance of Black and Veatch.

The bid evaluation was completed for the new ID fan variable frequency drives and the contract was awarded to Alstom. One drive will be replaced on Unit 2 this spring and then two on Unit 1 the following year. Alstom offered a drive similar to the existing LCI design, retaining our existing transformers and basic configuration. This will allow for the simplest installation with known performance with our existing motors. Alstom has indicated that they will support this design with parts for 20 more years.

Burner Line Balancing

Balancing dampers have been installed in all of the burner fuel lines for Unit 1 and the flow to each burner has been balanced. Balancing the fuel flow should assist in achieving the correct air and fuel balance at each burner for the desired NOx reduction with overfire air while also keeping CO emissions to the minimum levels. This work will be proceeded by testing to demonstrate to the State the level of CO emissions expected with the use of overfire air.

Unit 2 Thrust Bearing Wear Detector Trips

On August 2 and August 9, Unit 2 tripped during the weekly test of the turbine thrust bearing wear detector. This test is required as part of the turbine operating procedure from GE. At first, the problem was thought to be in one of the control board timers so it was replaced. After the second trip on August 9, it was determined that there was a mechanical problem in the wear detector that was preventing correct operation of the test solenoid. A bypass circuit was installed around the test wiring so that a unit trip could be avoided in the event of a test failure. Further investigation revealed that a critical clearance at the detector had opened up and that clearance was repaired and the test is now working correctly

Cleaning the Waste Water Holding Basin

Completed the demonstration project of drag lining the Waste Water Holding Basin and determined that this is a very cost effective method for removing the material accumulated on the east side of the pond. Removing this material that can be removed using the drag line will give us enough room to store several more years of scrubber sludge at the current in-flow rate . If the installation of scrubber oxidation air works as expected, the inflow may stop and no other removal will be required. A formal contract was prepared and given to the drag line company to extend their work through the winter.

DCS Project

The controls engineers went to Wickliffe, Ohio to review design strategy with ABB for controls on DCS project. The following areas were reviewed and discussed, Combustion

Controls, Burner Management, Turbine Control System, Boiler Feed Pump Controls and Main Control Panel Controls. The final graphic displays have been submitted to ABB for incorporation into the project. We will be working with ABB on faceplates for control work.

Air Heater Basket Replacement

The contract for replacement air heater baskets for the Unit 2 Secondary Air Heaters was prepared and sent out for bidding. The contract will be awarded to Alstom Power Inc., Wellsville, New York. The installation of the new air heater baskets will result in a reduction of FD Fan and ID Fan Pressure with a corresponding decrease in power consumption. We expect to reduce FD and ID fan power by a total of 1770 HP. We should also achieve a reduction in a furnace exit gas temperature that will improve plant heat rate and reduce coal burn.

September 5, 2006

Mr. Joel Vatsky
President
Advanced Burner Technologies
271 Route 202/206
PO Box 410
Pluckemin, NJ 07978

Dear Mr Vatsky,

I agree with your suggestion to have a direct meeting to discuss our differences and have tried to contact you by phone to set a date. I have not been able to reach you and suggest that you call me. I can be reached at (435) 864-6501.

Sincerely,

George Cross
President and Chief Operations Officer
Intermountain Power Service Corporation

cc: Garry Christensen
Jason Hardin, Fabian & Clendenin

February 22, 2007

Mr. Joel Vatsky, President
Advanced Burner Technologies
A Siemens Company
271 Route 202/206 South
P.O. Box 410
Pluckemin, NJ 07978

Subject: Response to Letter Dated February 12, 2007

Dear Mr. Vatsky:

We received your letter dated February 12, 2007 on February 17, 2007, and regret to inform you that we do not accept your alternate proposal as it is no different from what you previously offered and still leaves IPSC shouldering all of the costs to repair *your* mistake. We also do not wish to get into a "point - counterpoint" discussion at this time as we feel we have adequately expressed our concerns and, frankly, have already been down that path. Several statements from your letter do, however, warrant a minimal response:

- We did not perform the volumetric to mass flow conversion using sea level conditions. The calculation was done using mill exit conditions at 150° F. The mill exit absolute pressure is atmospheric (at 4700 ft elevation) plus the mill operating pressure. This, coincidentally, is approximately the same as sea level density at 150° F. A careful reading of our letter would have prevented you from the false assumption that sea level was used in our calculation.

- Many of the cracks in the nozzle tips did not originate at the dissimilar metal weld. There are more failure mechanisms than just overheating of that weld.

We hope you will change your position after you have had a chance to review our claim with Siemens management. In the meantime, we intend to formally serve you with our complaint.

Sincerely,

George W. Cross
President and Chief Operating Officer
Intermountain Power Service Corporation

JKH:jmj

History of IPSC Experience with ABT Burners

Presentation for Siemens, March 15, 2007

IP7020565

Contract History

ABT Contract for New Burners

- Established on September 16, 2003
- Replace original Unit 2 B&W burners in-service since 1987
  - Unit 1's were replaced in 1992, thermal distortion of registers
  - Unit 2's were modified in 1991, modified backplates
- 48 burners with flame scanners and burner air flow monitoring, Installed March 2004

Contract Economics

- Original Contract was for $2,237,415
- November 12, 2003 Addendum
  - 253 MA Materials Upgrade $40,800
  - Coal Flow Divider, X-Vane Spool $40,800
  - Air Flow Measurement Upgrade $35,220
- Installation on separate contract $1,616,800
- Total Cost to IPSC $3,971,035
- Total Amount Paid ABT on Original Contract $2,354,235

Project Design Objectives

- Environmental performance better or same as original B&W
  - No regulatory reason to change
- Improve register operation and availability
- Minimize erosion of coal flow components
  - Specified four-year minimum life at maximum coal flow
- Thermal stability - designed to handle thermal environment

Performance of ABT Burners

- Initial performance of burners was good
- Met or exceeded NOx, LOI and CO Requirements
- Flame stability was good over the load range
- Register adjustability was good - Major design objective

Problems Started After First Year of Service

Fire on F3 Burner, June 25, 2005

- Burner was removed from service
- Replacement burner purchased from ABT
- We believe fire started because of erosion of the burner barrel
- ABT believes fire started in the elbow

Inspected F Row Burners

October 15-18, 2005 - Unit down for unrelated Incident

- Found more problems, first knowledge of full scope of issues
  - Erosion of the coal nozzle side walls on the horizontal plane, complete hole on F6
  - Erosion of the nozzle tip
  - Cracks in the nozzle tip
  - Erosion of the elbows

Purchased Repair Parts from ABT

December, 2005 - January, 2006

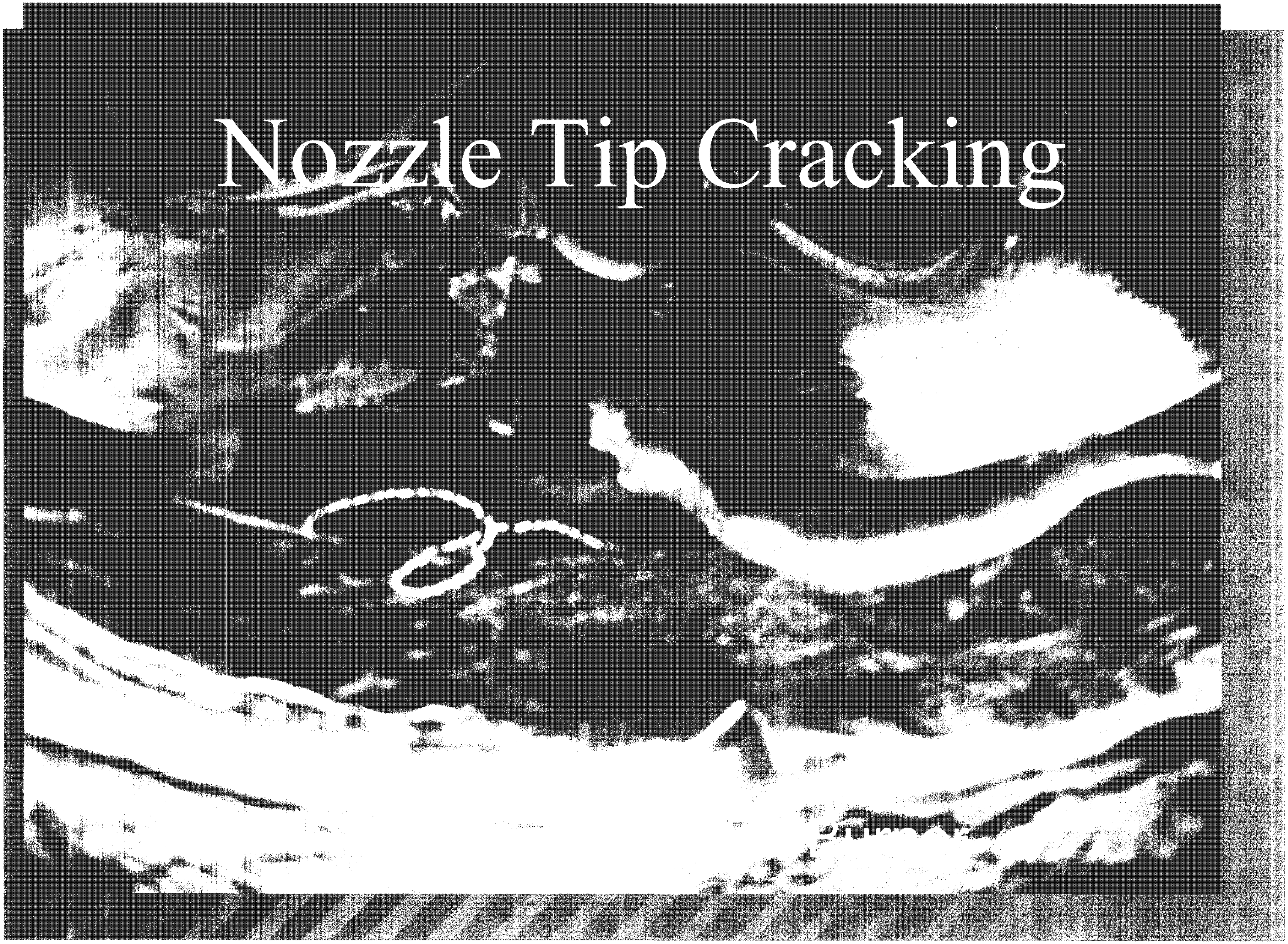
- Purchased burner tips segments and liners for burner barrels
  - IPSC paid $199,100 for materials from ABT
  - Also removed kicker on elbow
- Planned to install the parts during the April, 2006 Unit 2 outage.

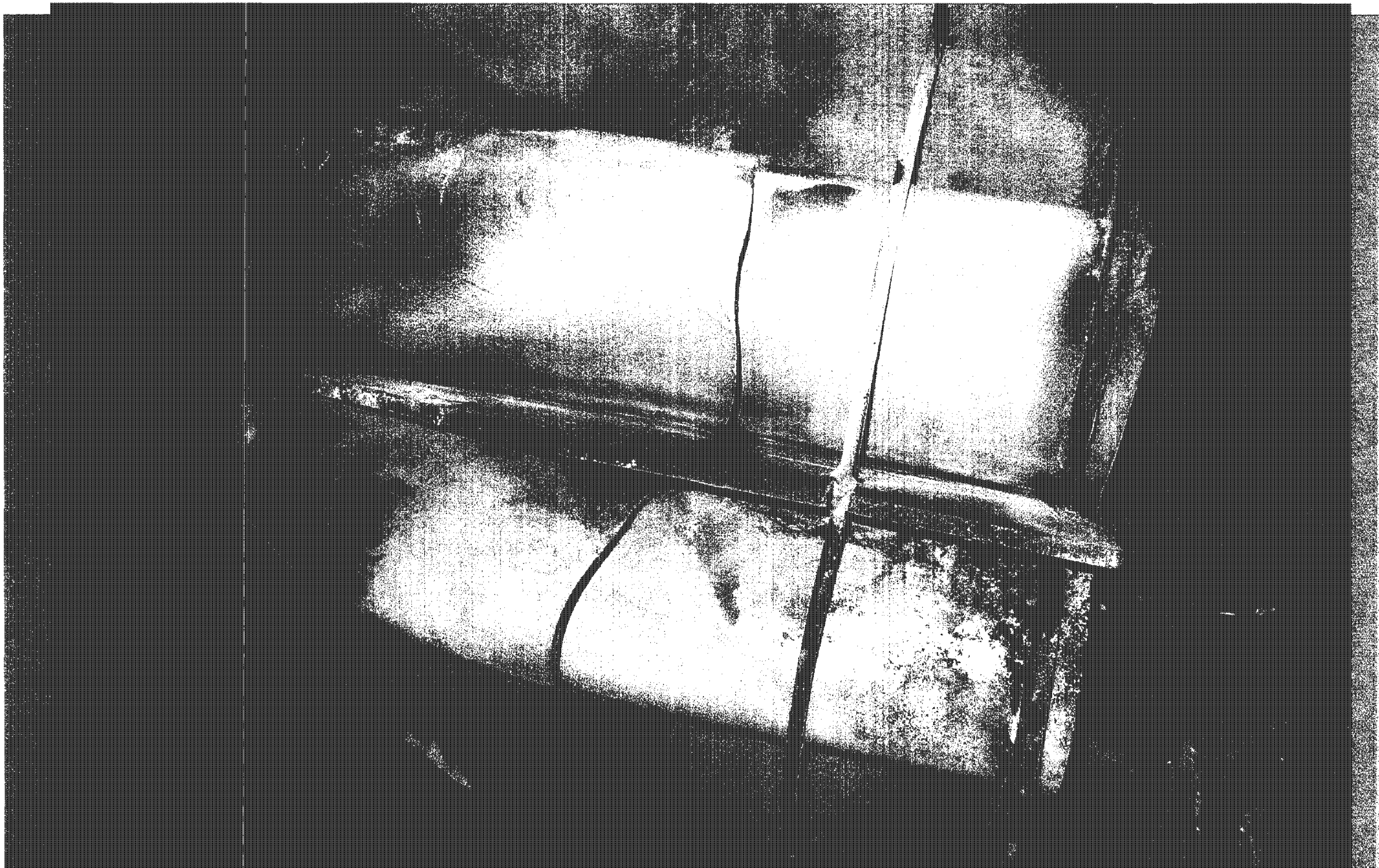
April 2006 Outage

Damage Was Extensive

- All 48 fuel injectors were pulled and inspected
- 20 of the tips were irrepairable and replaced with straight tips. 28 had tip liners installed.
- 7 burners with holes in the injector barrel on the horizontal plane. Many more very thin. All had erosion in this area.
- Diffuser and wear liner installed on all 48 burners

Nozzle Tip Cracking

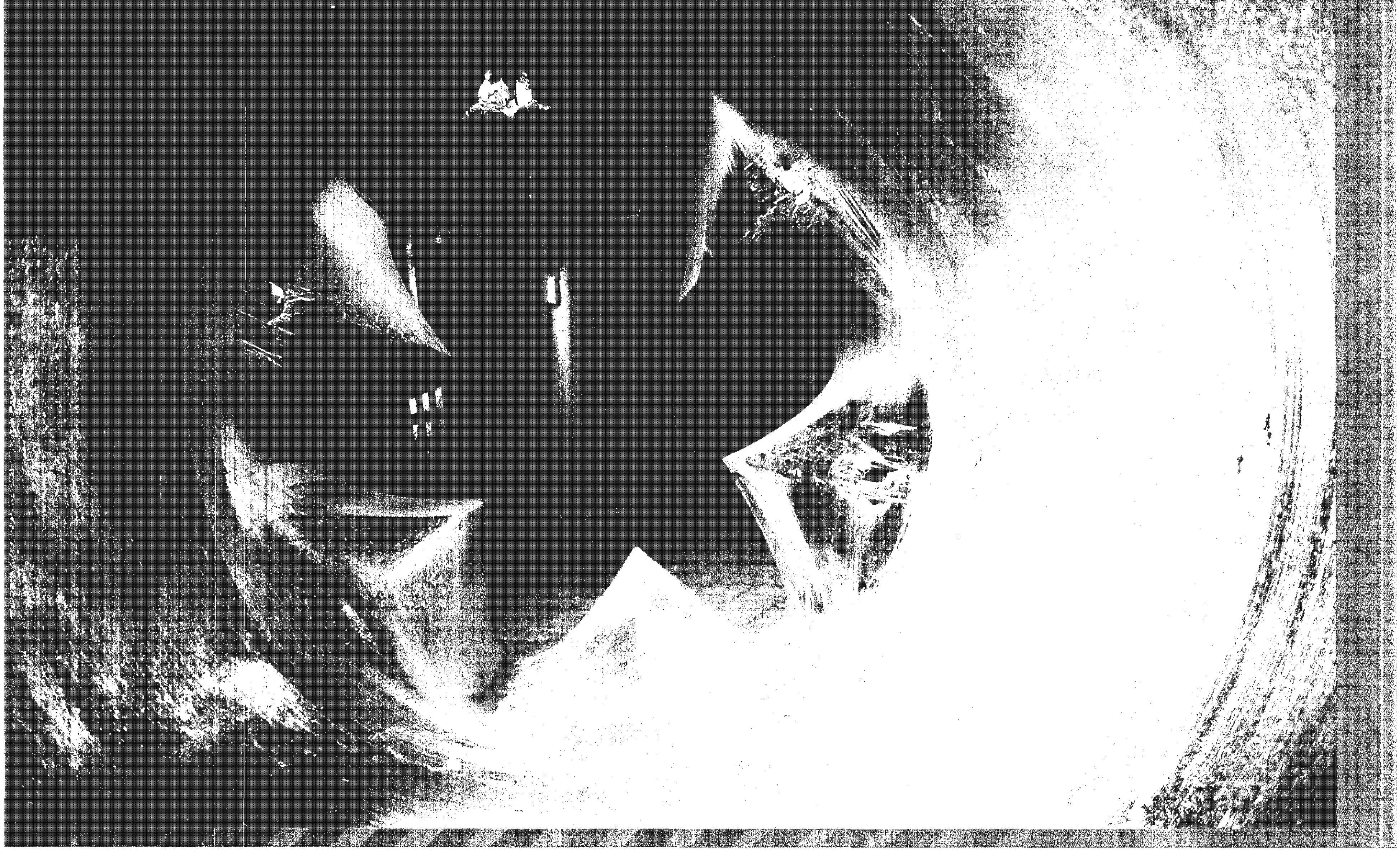




Nozzle Cracking, D6 Burner

IP7020575

G1 Burner Nozzle, Erosion Holes



IP7020577

Air Flow

Points of Contention

- IPSC
  - Burner air flow should have been designed for 260,000 lbs/hr
  - Based on OEM mill curves at maximum plus 5% and mill outlet conditions.
- ABT
  - Burners were designed for 210,000 lbs/hr
  - E-mail from IPSC
  - OEM curves are based on atmospheric conditions at altitude not mill outlet conditions

Erosion

Points of Contention

- IPSC
  - All wear should have been in the elbow per ABT proposal.
  - No component failures for four years from erosion per the contract
  - Poor angle of contact for nozzle tip.
- ABT
  - Erosion is the result of increased air and coal flows.

Nozzle Cracking

Points of Contention

- IPSC
  - Nozzles cracked from thermal stresses inherent in their design.
  - ABT claimed that no cooling air was required, IPSC always had cooling air on all out of service burner rows.
- ABT
  - All cracking originated from the dissimilar metal weld in the barrel. IPSC did not inform them of previous problems with B&W burner welds.

Summary and Resolutions

- IPSC will not backcharge ABT for all past repairs, materials and installation - $604,000
- IPSC will pay for installation of the new fuel injectors and diffusers - est. $250,000.
- ABT shall have a third party model flow and stresses to determine causes of failures.
- ABT shall supply redesigned replacement injectors and diffusers.

Economic Analysis
Unit Uprate Project
(As-Built Numbers)

Project Information and Economic Factors	
Life of Project (Years)	20
Cost of Replacement Energy ($/MWH)	$25
Interest Rate	6.35%
Net Generation Increase with HP Turbine Upgrade Only (MW)	25
Net Generation Increase With All Modifications (MW)	75
Fuel Cost Spot Market ($/MBTU)	$1.45
Total Project Cost ($1,000's)	$26,973
Annual Station Capacity Factor	90%

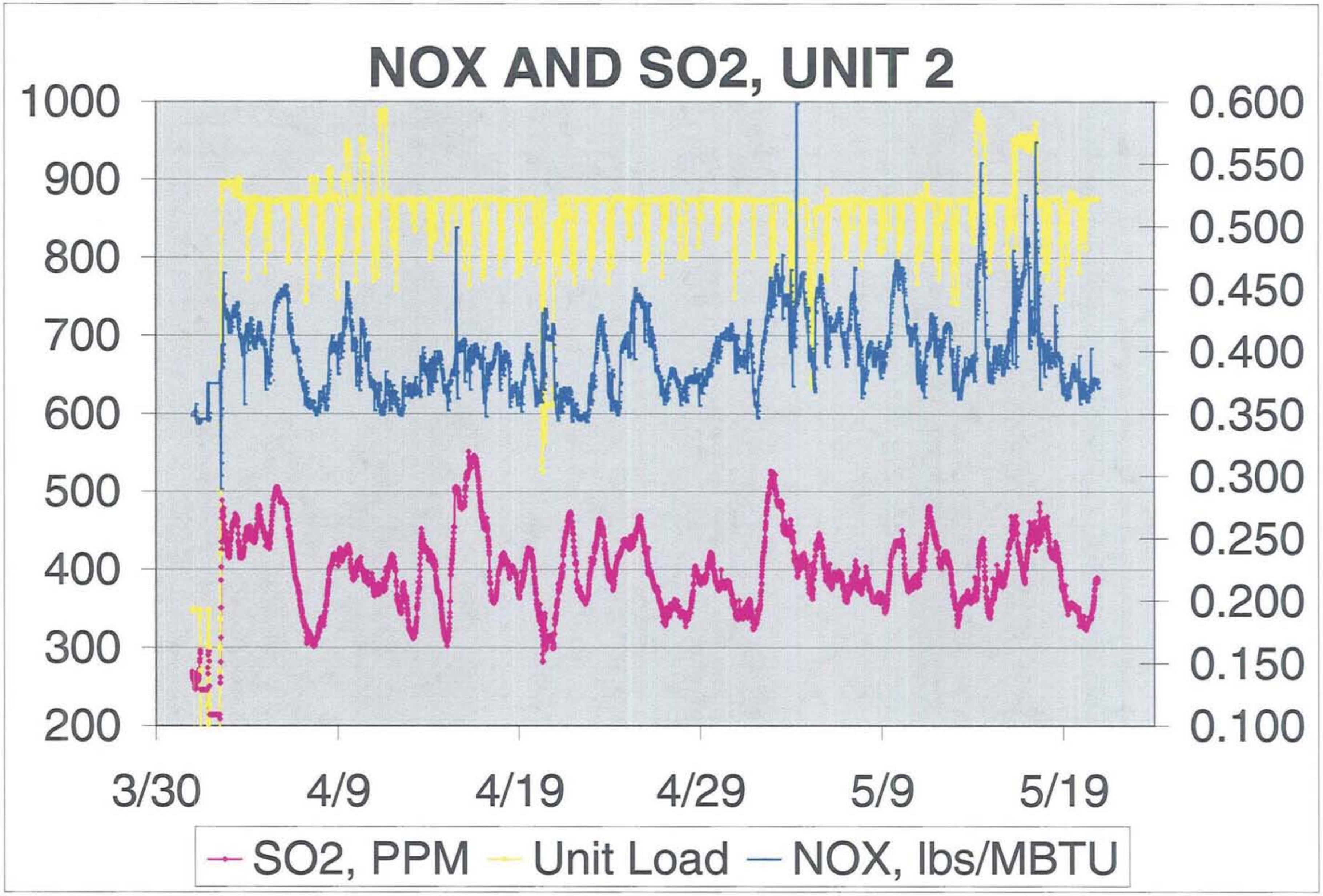
Economic Results	
Capital Cost per KW Increase ($/KW)	$180
Payback (Years)	1.01
Benefit/Cost Ratio	13.7
Cost of Additional Power (Mils/KWH) *See Note 2 & 4*	13.6

Performance Comparisons	**Before**	**After**
Station Gross Capacity (MW)	1750	1900
Estimated Unit Gross Heat Rate (BTU/KWH)	9028	8950
Estimated Annual Station Coal Burn (Tons/Year)	5,267,224	5,669,292
Estimated Station Auxiliary Loads (MW)	93	102

Notes:
1. Capital Cost per KW increases equals the total project cost divided by the net generation increase with all modifications
2. Cost of additional power equals capital cost of the project amortized over 20 years plus the cost of the increased fuel burn per year divided by the annual net generation increase with all modifications.
3. Spot market price of fuel is used because the increased coal usage will be purchased outside of the long term contracts.
4. O&M costs are not included in the cost of additional power because it is assumed that they will not increase significantly as a result of the project.

Prepared by Jerry-H 12/2002

IP7020582


NOX AND SO2, UNIT 2
1000
900
800
700
600
500
400
300
200
0.600
0.550
0.500
0.450
0.400
0.350
0.300
0.250
0.200
0.150
0.100
3/30
4/9
4/19
4/29
5/9
5/19
SO2, PPM
Unit Load
NOX, lbs/MBTU

IP70205083

List of Major Changes from July 1, 2001 to July 1, 2004

1. **Unit Load Increase**: The gross capacity of each unit was increased from 875 MW to 950 MW due to a series of capital projects. The main facilitating project was the installation of new high efficiency high pressure turbine sections manufactured by Alstom, Inc. This load increase was accomplished without a significant increase in regulated pollutants. Other projects involved with the load increase are:
   a. Helper Cooling Tower
   b. Main Step-up Transformer Cooling Increase
   c. Iso-phase Bus Duct Cooling
   d. Increase Circulating Water Make-Up Capacity
   e. Increase Boiler Safety Relief Capacity
   f. Boiler Feed Pump Re-Rate
   g. 6A, 6B Heater Drain Line Modification

2. **Changes in Coal Quality:**. Unit 1 has seen almost a 20% increase in sulfur loading to the scrubber since the unit capacity increase projects were completed. A corresponding increase in fuel bound nitrogen and fuel ratio, which are the main coal properties responsible for NOx, has also been noticed. This increase in emissions potential far exceeds the approximate 7% increase in heat input to the boiler from the unit load increase. This change in coal quality in the last few years has mandated some capital projects to insure continued operation and environmental compliance. In the scrubber, forced oxidation air was added to the scrubber reaction tanks to insure completion of the chemical reactions that result in gypsum crystals in the recycle slurry. Incomplete oxidation would result in sulfite crystals which have a high tendency to scale and plug the sprays and mist eliminators. In the boiler, over-fire air was added to both units to reduce NOx emissions and insure compliance with the current permit limits.

   As a side note, the addition of oxidizing air to the scrubbers may make it possible for us to sale the gypsum produced in the scrubber for wall board manufacturing. We are currently involved in negotiations with US Gypsum who desires to purchase the gypsum produced at IGS for use in their Sigurd, Utah, wall board plant.

3. **Updated Distributed Control System:** Due to concerns with parts availability and capacity, we have entered into a contract with ABB to replace our original main control and information computers with a new distributed system. The new system will replace the existing Fox 1A Information Computer, Videospec Control System, Rochester Annunciator, Bailey Burner Management System and GE Turbine Control System with one system. When completed, the existing mimic panels will be removed and replaced with a computer terminal desk capable of controlling most plant functions. In March, 2004, the first phase of a new information computer was completed on Unit 2. The same will be done on Unit 1 in March, 2005. The first control system will be replaced on Unit 2 in 2006.

4. **Scrubber Renovations**: In the last few years, the scrubber modules on both units have been showing the signs of almost twenty years of service in a very severe environment. There was significant corrosion and wear of both the inlet and outlet ducts, seal skirt, mist eliminators, mist eliminator spray piping, expansion joints and recycle piping. In order to insure continued high availability, a program was initiated to rehabilitate the scrubber modules in stages. The recycle piping was removed and relined with a rubber coating. The inlet and outlet ducts were repaired and then clad with a high nickle, corrosion resistant "wallpaper" that will all but eliminate any further corrosion. The mist eliminators were replaced along with the mist eliminator piping and nozzles. Completion of these projects in mid-2004 should allow the scrubbers to complete another twenty years of service.

5. **Unit 2 Burner Replacement**: In March, 2004, the original burners on Unit 2 were replaced with new burners manufactured by Advanced Burner Technologies (ABT). The Unit 1 burners were replaced in 1989 by B&W after experiencing significant overheating damage. Modifications were made to the Unit 2 burners at the same time to extend their life and it was hoped that we would get a few more years of service. Through good maintenance and diligent operation, we were able to get almost 15 years.

6. **ID Fan Variable Speed Drives**: The variable speed drives for the induced draft fans on both units were originally supplied by Westinghouse and they have since closed down that division making parts difficult to obtain. In March, 2004, on Unit 2, we replaced the first drive with a model manufactured by Alstom, Inc. We will use the parts removed to maintain the other Westinghouse drives still in-service. The new Alstom drives are Load Commutated Inverter (LCI) drives like the original Westinghouse which means the same motors could be used. They do have updated controls which results in a higher efficiency.

Significant events for November 2005

1. Generex Replacement - Completed the bid analysis and awarded a contract to GE for a replacement Generex system on Unit 2. The Generex system needs to be replaced because GE no longer manufacturers replacement parts. G.E. contractors came on site to start the installation design and they received both hard copies and soft copies of the vendor prints of the old Generex system. They were given one line power system diagrams of the generator and surrounding power system and the generator protective relay settings. Installing the new Generex system will also require replacing an existing Motor Control Center and that equipment was purchased.

2. Unit 2 Burner Repair Plan - We met with ABT to discuss the problems we are having with erosion of their burners that were installed less than two years ago. ABT recommends that install some temporary erosion shields on the burner barrel and at the nozzle tip. That should allow us to operate for another two years. After two years, they recommend that we replace the entire nozzle assembly and the burner elbow. We are evaluating other options.

3. Carbon Fiber Installation- The contract was completed for bidding the installation of the carbon fiber on Unit 2. We will be installing carbon fiber on 54 sections on Unit 1, we did 38 on Unit 1 last outage. We have modified the installation procedures to eliminate the problem we had with final coating adhesion. No longer than 24 hours of cure time will be allowed between each step of the process, this will insure full layer adhesion. We also contracted with CORRPRO to install the grounding straps on each section necessary for the cathodic protection system.

4. DCS Factory Acceptance Test (FAT) - The Phase 3 FAT was completed successfully. A total of 123 deficiencies were identified to ABB. Some deficiencies were identified and corrected during the testing an not included with this list. The majority of the 123 deficiencies have been resolved. A follow up battery of tests is scheduled for the week of December 19, 2005. Testing of most of the remaining deficiencies should be completed at that time. Remaining deficiencies or new deficiencies identified the week of December 19th will be scheduled for resolution and testing prior to the implementation of Phase 3 during the Unit 2 Major Outage planned for April of 2006.

Status of ABT Dispute
October 17, 2007

1. IPSC and Siemens has agreed that the new injector should be modeled at 269,000 lbs/hr primary air flow. This is very similar to the number we had on our letter to ABT on November 13, 2006 which was 259,428 lbs/hr.

   a. Siemen's testing had primary air flow 8% high maximum

   b. IPSC testing had primary air flow around 4% high, which we have corrected

2. Siemen's stated that their material testing showed that all of the cracks originated from the eroded and thinned areas of the nozzle. Primary failure mechanism was erosion and not overheating.

   a. IPSC has not argued this point with Siemen's but, we still believe some of the cracking came from overheating of the nozzle. We have sent off a sample to Thielsch Engineering for an independent analysis.

   b. This issue may go away if Siemen's modeling shows overheating and they address it in a redesign with improved cooling to the nozzle tip.

3. We get the impression from Bob Allen that Siemen's believes ABT incorrectly used the 210,000 lbs/hr for primary air flow but, they also believe we should have stated the design point clearly in the specification and not used a curve.

4. We have not heard much from Siemens since they started the design review. We have supplied any information they have requested in a good faith effort to resolve this issue without litigation. All information they have sent has been slow because it is getting legal review by their attorneys.

May 2004 Significant Items for Eric Tharpe - Engineering and Labs

1. Boiler Testing, Unit 2 - Worked with Advanced Burner Technologies (ABT), the burner supplier for Unit 2 to tune the Unit 2 boiler combustion process to meet the requirements of the contract and to demonstrate to the Utah State DAQ that we are complying with our current NOx and CO requirements. The tuning consisted of testing with a measurement grid at the economizer outlet to look for low levels of oxygen and corresponding high levels of CO. Adjustments were then made to individual burners to distribute the air evenly across the entire cross section of the boiler.

2. DCS Control Logic Factory Acceptance Test - The Distributed Control System engineering team went to Wickliffe, Ohio, during the month of May to verify and test the control logic for the third and fourth phases of the project. This needed to be completed at this point so the logic can be sent to the simulator manufacturer, ESSCOR who will build the simulator used to train the unit operators prior to installation on Unit 2 in 2006.

3. Circulating Water Line Repair - Began the design process for repairing the concrete circulating water lines. KPFF Consulting Engineers, Phoenix, Arizona will be used to design the carbon fiber repair process that will be used. KPFF designed the repairs at the Palo Verde Nuclear station and has done extensive testing to refine their design. When completed, the repaired sections should have the same strength and expected life as the undamaged sections of pipe.

July 2007

Engineering and Lab Significant Accomplishments

Unit 2 Burners - Tested Unit 2 pulverizer air flows and control fineness with Siemens. Met with Siemens to discuss preliminary air flow measurements which were higher than expected. We are reviewing preliminary test data to determine the next step in the process of resolving the Unit 2 burner deficiencies.

Unit 2 Trip - Unit 2 tripped on July 19 because of an I/O module failure in the DCS Burner Control System. The failed module receives three boiler trip inputs. The trip was caused by the system receiving a bad quality status input for all three signals. We have worked with ABB to redesign the system to separate the signals so a single module failure can not cause a unit trip. The system will be modified during the next available outage.

Cathodic Protection System Installation - Cache Valley on site to begin installation of new cathodic protection system for the circulating water lines. They started drilling wells of anode and monitoring electrode installation, installing conduit and wiring and mounting equipment.

Water Quality Lab Instrumentation to Distributed Control System Information - I&C completed the installation of wiring, continued verifying instrumentation, and developed Unit 2 graphics. Waiting for dissolved oxygen sensor and updates to the DCS Coordinated Control System.

Reverse Osmosis System - Reverse Osmosis System placed in service, working on fine tuning control logic, control components and display graphics. Trained operators on the system.

Significant Items for January

Helper Cooling Tower Electrical Design and Electrical Construction Contract

The 140 electrical design drawings and specifications needed for the helper cooling tower were completed by engineers from CEntry and IPSC and they were forwarded to four contractors for bidding. The electrical contract sent out for bid also included the work needed for this upcoming outage in the boiler for the overfire air system and various other small projects. The cooling tower portion of the work was bid as a fixed price contract while the remaining work will be done on a time and material basis. GSL Electric Inc. of Sandy, Utah, was the low bidder for the work and they have been awarded the contract. GSL was the contractor for the preliminary electrical work for the helper cooling tower under Weyher Construction's contract. GSL is a large electrical contractor with offices throughout the west and is ranked in the Top 100 Electrical Contractors by Electrical Contractor Magazine.

Contractors Arriving for Unit 1 Outage

The Unit 1 March outage will have more work completed than any other outage in the history of IPSC and more construction work since the original construction of the units was completed in 1987. Contractors started arriving in January and setting up their trailers and staging material in anticipation of that work. The largest visible amount of materials already arrived are the many pallets of scaffolding material needed to scaffold the inside of the boiler. This work will be done by Safeway Scaffolding and will be the first time in the history of IPP that the boiler has been scaffolded from the bottom to the top of the boiler. TEI, the construction subsidiary of Babcock Power, arrived with their tools and equipment to start work on the overfire air system. They have already begun work that can be completed with the Unit on-line. Other contractors will be arriving in February.

2003-04 Budget

The 2003-04 IPSC budget has been prepared and forwarded to LADWP for their review according to schedule. Prior to fiscal year 2001-02, the IPSC budget was relatively constant reflecting the newness of the facility and little need for large capital improvements. The plant uprate project started in 2001-02 along with some increased maintenance expenditures which raised the IPSC budget to new highs. The 2003-04 budget continues that trend with increased maintenance costs due to aging equipment and high capital costs from the final year of the plant uprate project along with some major capital replacements. Some of the major items from the budget are as follows:

Operation and Maintenance Costs

- Overhaul of the Unit 2 Generator
- Dredging of the Wastewater Holding Basin
- Boiler Feed Pump Turbine Overhaul
- Increased Pulverizer Maintenance
- Replacement Conveyor Belt for Coal Conveyor 6.

- Replacement Fan Blades for the Cooling Towers
- Decreased Revenue from Flyash Sales Due to an Anticipated Reduction in Ash Quality
- Reconditioning of Electrical Breakers and Battery Replacements
- Increased Emission Fees

Capital Replacements and Modifications

- Replacement and New Man-Lifts
- Spare Pulverizer Motor
- Replacement Igniter Booster Air Compressor
- New Distributed Control System (DCS)
- ID Fan Drive Replacements
- Unit 2 Boiler Modifications for the Plant Uprate Project
- Unit 2 Air Heater Element Replacements
- Unit 2 Burner Replacements
- Forced Oxidation Air for the Scrubbers
- Unit 2 Flame Scanner Replacement

We do not foresee the ability to decrease the budget back to earlier levels anytime in the future. Many of the projects listed above are multi-year projects with expenditures scheduled for up to five years ahead. Some large replacements, such as a generator rewind on Unit 1, are scheduled for the following year and other projects are looming on the horizon.

Significant Items for February, 2004 - Engineering Services

1. Unit 2 Trip on February 13, 2004: There was a Unit 2 outage February 14, 2004 to repair a leak in the boiler back-pass at soot blower 97. The soot blower failed in the boiler because the home position limit switch stuck in the intermediate position. The soot blower remained inserted and blowing on the tubes for approximately 27 hours and eroded through the tube wall. Approximately fifteen tubes were damaged as a result of this incident. The Unit was returned to service on February 15, 2004.

2. Unit 1 Trip on February 20, 2004: There was a Unit 1 outage on February 20, 2004 to repair a leak in the reheat section of the boiler. The failure was the result of short-term overheat caused by tube blockage. The blockage was caused by metal oxide particulate filling the affected tube eliminating the cooling steam flow. Without cooling steam flow, the tube ruptured, eroding three tubes next to the original leak. Four Reheater tubes were cut out and replaced. The blocked tube was cut out and the loose scale removed. The cleaned tube was then welded back into the boiler. The Unit was returned to service on February 21, 2004.

3. Unit 2 Outage Preparations: Preparations were wrapping up for the Unit 2 Outage. This outage will have more construction activity than any other outage in IPSC history. The status of major projects is as follows:

    a. DCS Project: The factory acceptance test for the new information computer system from ABB was completed and the equipment was sent to the plant for installation during the outage. Capital Electric, the installation contractor, arrived on-site and completed internal wiring of the cabinets and communication wire pulls.

    b. Boiler Over-Fire Air and Superheat Pendent Extensions: All of the material was received for the over-fire air system and superheat pendent extensions similar to what was done on Unit 1 last year. Most of the material was staged on the boiler levels and structural interferences were removed to speed up installation during the outage.

    c. Burner Replacements: The new burners that will be installed on Unit 2 were received from the manufacturer, Advanced Burner Technologies and they were also staged on the boiler platforms. The burners instrument air lines were tested for leaks and some repairs were made. All of the attaching instruments and supply lines were test fitted to one of the new burners to insure correct interface between all of the components.

    d. ID Fan Drive Replacement: The first of the new Induced Draft (ID) fan variable speed drives that will replace the existing drives was received from Alstom after a factory QC inspection and testing. The final arrangements were also made for connection of cooling water to the new drive. The drive will be installed on ID Fan 1D.

4. Unit 1 Blowers Received and Installed for Scrubber Oxidation Air System: The first two blowers for the scrubber oxidation air system were received and installed in Unit 1. The blowers were manufactured by Atlas-Copco and are driven by 600 Horsepower, 3600 RPM motors. Final electrical connections are being made to the new blowers and the first blower will be placed into service in mid-March.

Significant Items for August

1. **Unit 2 Burner Contract:** Early on in the project, a problem was noted with the burners on both units that caused them to overheat and deform. At that time, the Unit 1 burners were so bad that they were completely replaced with a new design while the Unit 2 burners were just repaired and modified. The Unit 2 burners are at the point now where they also need to be replaced and funds were placed on this years budget for that purpose. A contract has been prepared and bids received for these new burners. The contract will be awarded to Advanced Burner Technologies (ABT) from New Jersey. ABT specializes in after market burners and has a proven track record in large coal boilers. Bonanza power plant in Vernal, Utah, installed ABT Low NOx burners in their unit several years ago and noticed a significant reduction in NOx emissions while maintaining good performance. The new burners will be installed during the outage next spring.

2. **Induced Fan Variable Speed Drives**: The existing ID fan variable speed drives are failing at an increasing rate and parts are becoming more difficult to obtain. We are planning to replace the drives over a five year period and use the removed parts to keep the operating systems in service. The specifications for the ID fan drives were prepared with the assistance of Black and Veatch and they have been sent out for bidding. Bids are due back the week of September 8.

3. **Burner Line Balancing**: Balancing dampers have been installed in all of the burner fuel lines for Unit 1 and the flow to each burner has been balanced. Balancing the fuel flow should assist in achieving the correct air and fuel balance at each burner for the desired NOx reduction with overfire air while also keeping CO emissions to the minimum levels. This work will be proceeded by testing to demonstrate to the State the level of CO emissions expected with the use of overfire air.

4. **Unit 2 Thrust Bearing Wear Detector Trips**: On August 2 and August 9, Unit 2 tripped during the weekly test of the turbine thrust bearing wear detector. This test is required as part of the turbine operating procedure from GE. At first, the problem was thought to be in one of the control board timers so it was replaced. After the second trip on August 9, it was determined that there was a mechanical problem in the wear detector that was preventing correct operation of the test solenoid. A bypass circuit was installed around the test wiring so that a unit trip could be avoided in the event of a test failure. Further investigation revealed that a critical clearance at the detector had opened up and that clearance was repaired and the test is now working correctly.

Significant Items for April 2008
Engineering and Labs

Major Capital Projects Completed on Unit 2 During Outage

Programmable Logic Controller (PLC) Upgrade to Distributed Control System (DCS) I/O - The original design of the controls for both units included Modicon PLC's and I/O for many of plant auxiliary systems that was independent from the main control system. We completed a project several years ago that replaced the main control system with a new DCS. We have been phasing out obsolete Modicon equipment for many years. This project replaced the Modicon PLC's and I/O used for the plant auxiliary system with DCS I/O and the logic for the equipment was moved to the DCS servers.

Repaired 46 Sections of Circulating Water Pipe - The structural integrity of the circulating water pipes have been compromised by corrosion of the reinforcing wires. Testing completed four years ago indicated that 144 of the 420 sections on Unit 2 were corroded and a structural analysis recommended that 101 of those sections be reinforced with carbon fiber. 55 of the sections were completed in 2006 and the remaining 46 sections were repaired during this outage. Testing was also completed to measure the extent of corrosion that has occurred in the last four years. Additional sections will need to be done in two years based on that testing.

A cathodic protection system was recently placed into service that should retard or stop the rate of corrosion on this pipe.

Modified Boiler Feed Pump Turbine Controls - In an effort to improve reliability and avoid significant operating costs associated with derate and forced outage of the boiler feed pump turbine (BFPT), we upgraded the existing 20 year old GE-MDT20 analog controls with digital controls and a state-of-the-art governor system.

Replaced Unit 2 Burner Injectors - New burners were installed on Unit 2 in 2004 that were supplied by Advanced Burner Technologies (ABT). We noticed failures of the burner injectors just one-year after placing them into service. After a lengthy negotiation with Siemens (who acquired ABT), Siemens agreed to redesign and supply new burner injectors at 50% of their cost which was considerably less than previous proposals from ABT before they were acquired by Siemens. This new injectors and flat back elbows were installed on all 48 burners during the outage.

Significant Items October 2007

Resolution of Dispute with ABT

We have reached a tentative agreement with Siemens on the resolution of the dispute with Advanced Burner Technologies over the new burners that were installed on Unit 2 in 2004. Siemens has redesigned the burner injector and elbow assembly to address the erosion problems. The new injector tip will be larger in diameter to lower the velocities and extend the transition to flatten out the areas of erosion. Wear resistant ceramic liners will be added to the burner barrel in the areas of highest erosion.

Siemens proposal for financial responsibility was a 50% sharing of the direct cost of the materials. Siemens will pick-up all of the engineering and commissioning costs (See below). IPSC will pay for all other costs including installation.

Siemens Engineering and Six Sigma Evaluation	$347,000
Burner Commissioning Costs	$112,000
Total Engineering	**$459,000**
Fuel Injectors	$1,235,000
X-Vane Diffusers	$130,000
Flat-Back Elbows	$390,000
Total Materials	**$1,755,000**
IPSC Share of Materials	**$877,500**

Completion of Phase II, Surface Water Supply Line Replacement

Installation of Phase II of the surface water supply line replacement has been completed. Weyher has replaced the railroad tracks and roads and pipeline has been placed into service.

Phase II consists of 700 ft. of new pipe which starts at the new valve box installed last year and goes west to the laydown yard where it will tie-in to the existing pipe. The existing pipe from there west to the SCU's has no signs of failure at this time. The new pipe is 48" steel pipe with cement lining inside and out. The outside also has a polyethylene tape wrapped around the metal for additional corrosion protection. The pipe will also be protected by an anode bed cathodic protection system

Unit 1 Generator Bushing Leak

A leak developed on the Unit 1 transformer and using a borescope we were able to determine that it was coming from the "A" phase low side bushing which required an immediate outage to repair. After Doble testing all three low-side bushings, we decided to replace all three bushings because the Doble readings had changed and we could not explain why. The transformer was partially drained and the bushings removed. We used three new bushings that we just received for rebuilding the spare transformer instead of using rebuilt bushings.

IPP Coordinating Committee

Presented August 20, 2007

By George Cross

OUTLINE

- Operations Highlights
- Maintenance Highlights
- Engineering Highlights
- Support Services Highlights
- Environmental & Water Issues

Operations Highlights

- Production Report (FYE)
- Production Summary
- Fly Ash Sales

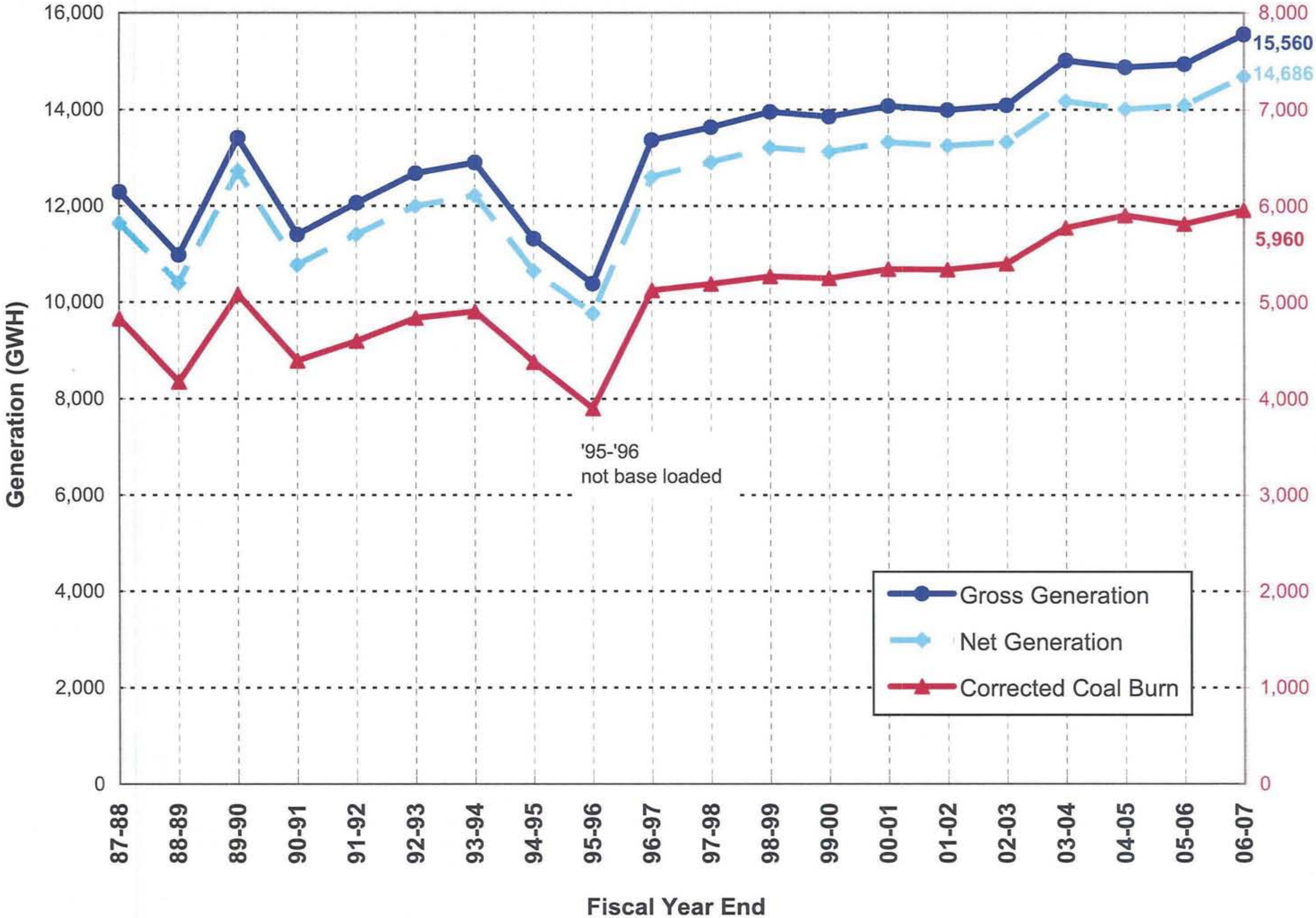
PRODUCTION REPORT

IGF production levels for fiscal year 2006-2007

(as compared to previous IGF's production levels)

• Gross Generation	15,560	GWhr	- Highest
• Net Generation	14,686	GWhr	- Highest
• Coal Burn	5,960	ktons	- Highest

Historical IGF Gross and Net Generation plus Coal Burn



IP7020601

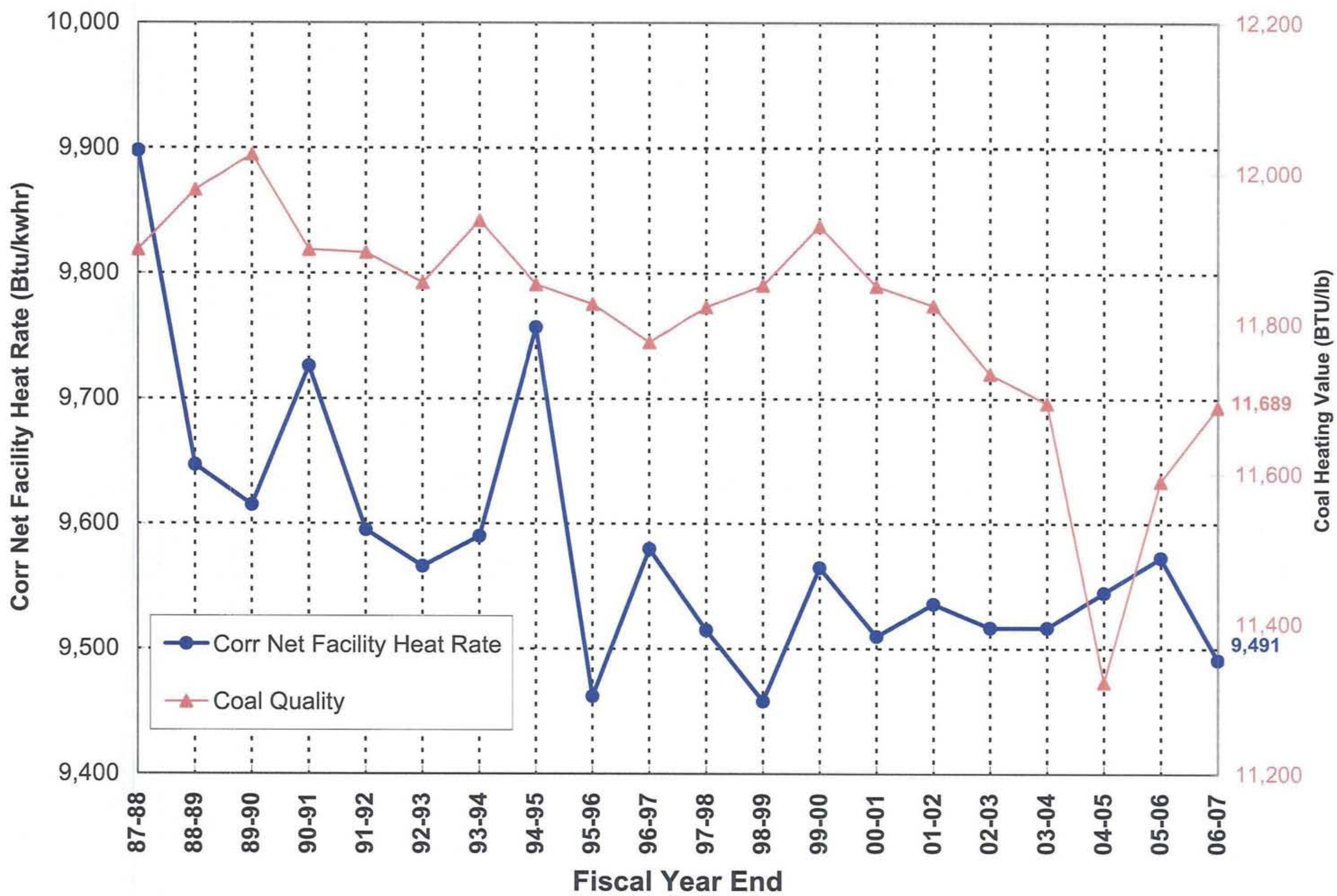
PRODUCTION REPORT

IGF production levels for fiscal year 2006-2007

(as compared to previous IGF's production levels)

• Coal Quality	11,812 Btu/lb	- improved
• Net Facility Heat Rate	9,491 B/kwh	- 3rd Best

Historical IGF Heat Rate and Coal Quality



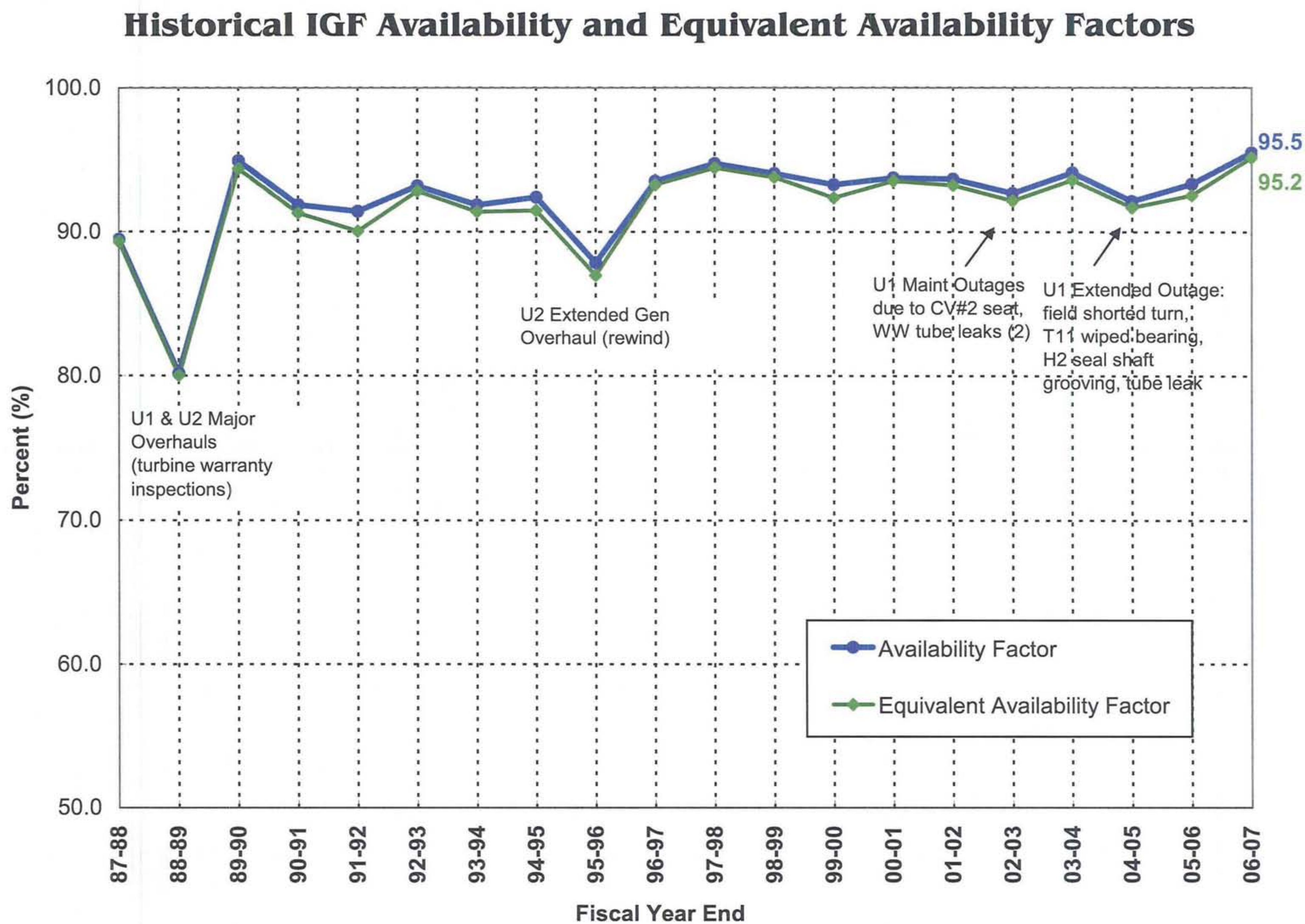
IP7020603

PRODUCTION REPORT

IGF production levels for fiscal year 2006-2007

(as compared to previous IGF's production levels)

• Availability	95.5 %	- Best
• Equivalent Availability	95.2 %	- Best


Historical IGF Availability and Equivalent Availability Factors
100.0
90.0
80.0
70.0
60.0
50.0
Percent (%)
95.5
95.2
U1 & U2 Major Overhauls (turbine warranty inspections)
U2 Extended Gen Overhaul (rewind)
U1 Maint Outages due to CV#2 seat, WW tube leaks (2)
U1 Extended Outage: field shorted turn, T11 wiped bearing, H2 seal shaft grooving, tube leak
Availability Factor
Equivalent Availability Factor
87-88
88-89
89-90
90-91
91-92
92-93
93-94
94-95
95-96
96-97
97-98
98-99
99-00
00-01
01-02
02-03
03-04
04-05
05-06
06-07
Fiscal Year End

IP7020605

PRODUCTION REPORT

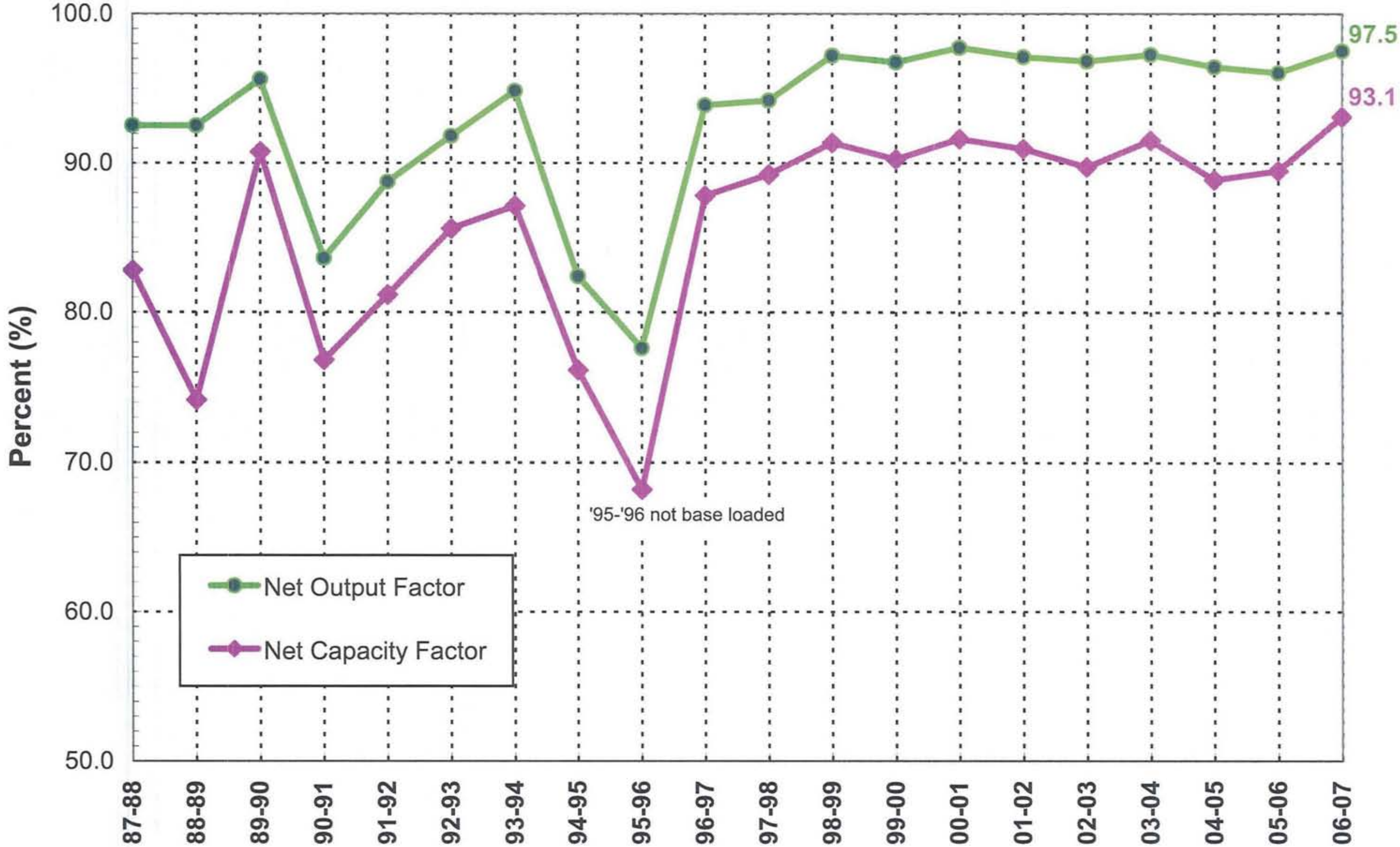
IGF production levels for fiscal year 2006-2007

(as compared to previous IGF's production levels)

- Net Output Factor 97.5 % - 2nd Best
- Net Capacity Factor 93.1 % - Best

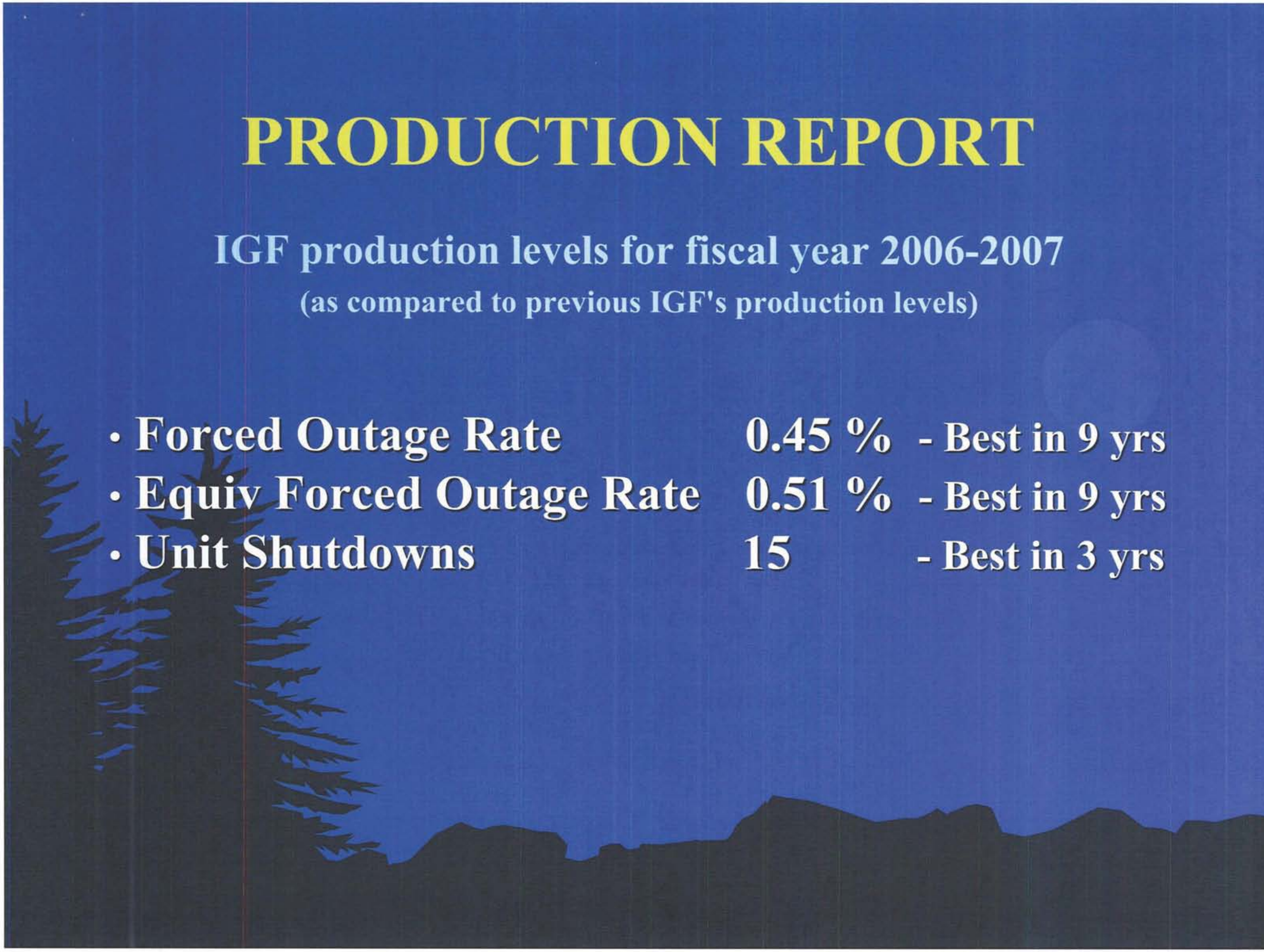
IP7020606

Historical IGF Net Capacity and Output Factors

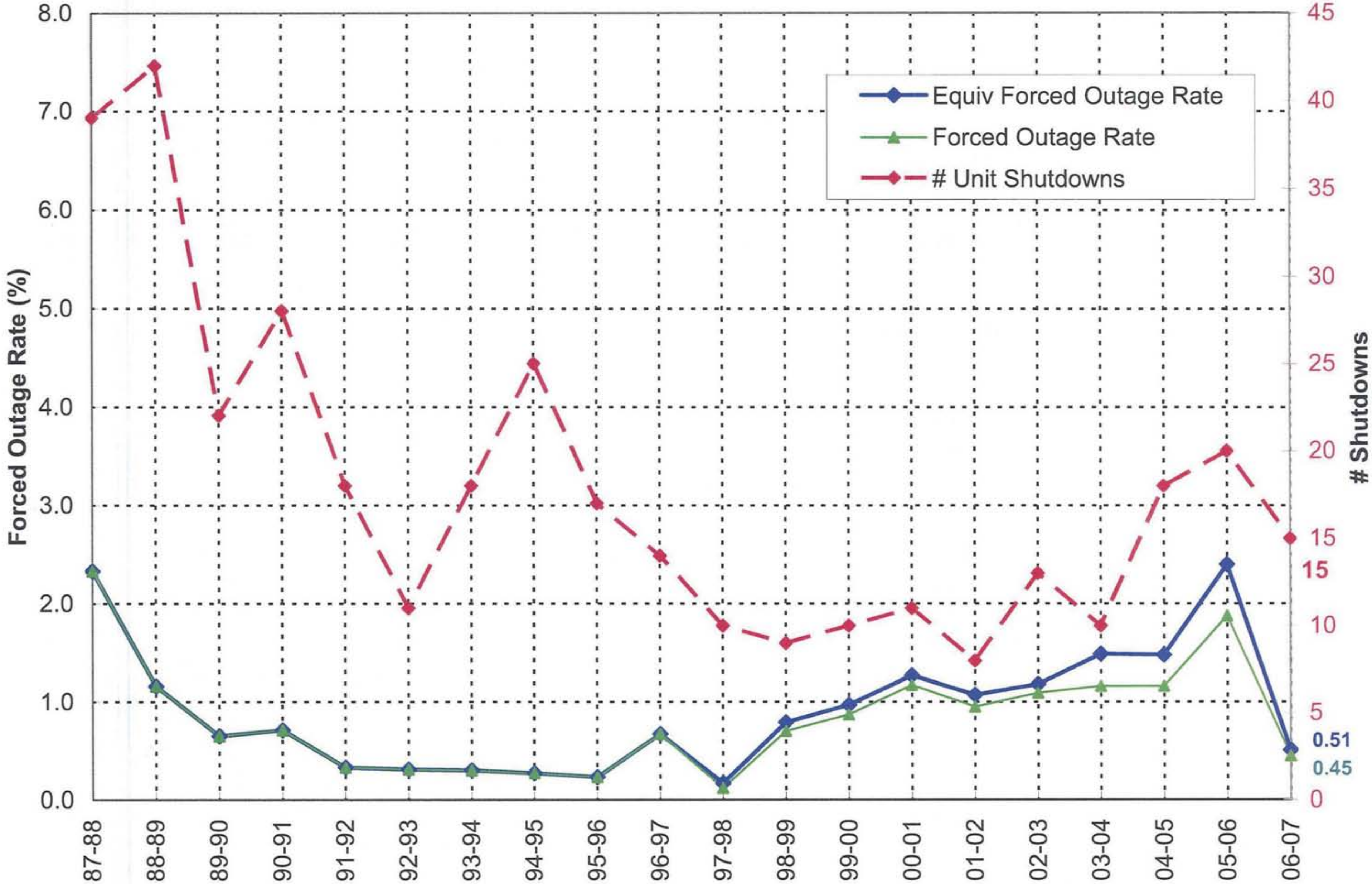


NOTE: The difference between Net Capacity and Net Output Factors is the downtime related to outages (i.e.: Availablity Factor). NOF is the average load level while the Units are in-service. NCF is the average load for the entire year, including shutdowns.

IP7020607


PRODUCTION REPORT
IGF production levels for fiscal year 2006-2007
(as compared to previous IGF's production levels)
• Forced Outage Rate 0.45 % - Best in 9 yrs
• Equiv Forced Outage Rate 0.51 % - Best in 9 yrs
• Unit Shutdowns 15 - Best in 3 yrs

Historical IGS Forced Outage Rates and Unit Shutdowns



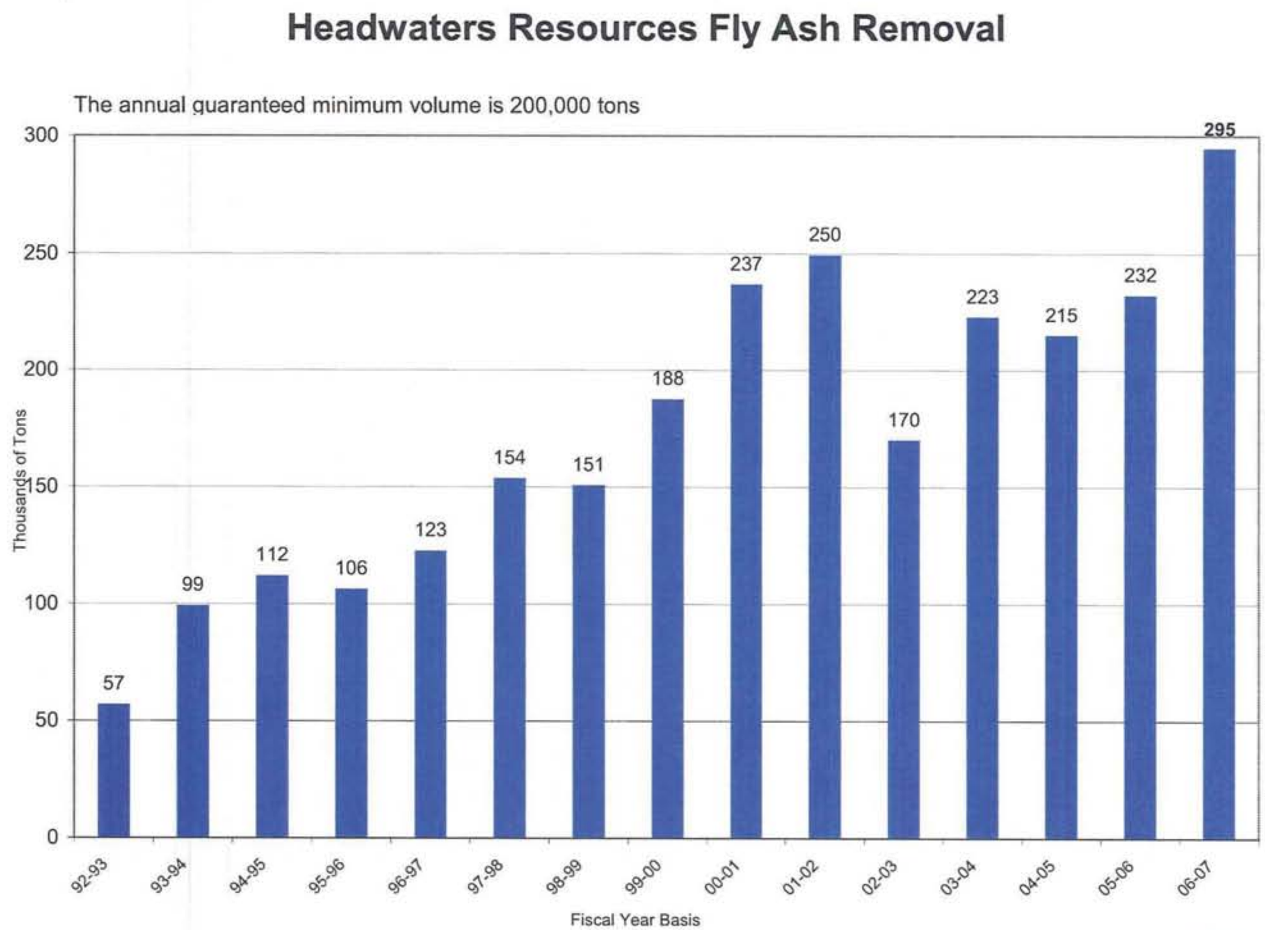
NOTES: Equivalent Forced Outage Rate is the total time charged to forced outages and unit derates.
Forced Outage Rate is the time charged just to forced outages (unit trips).

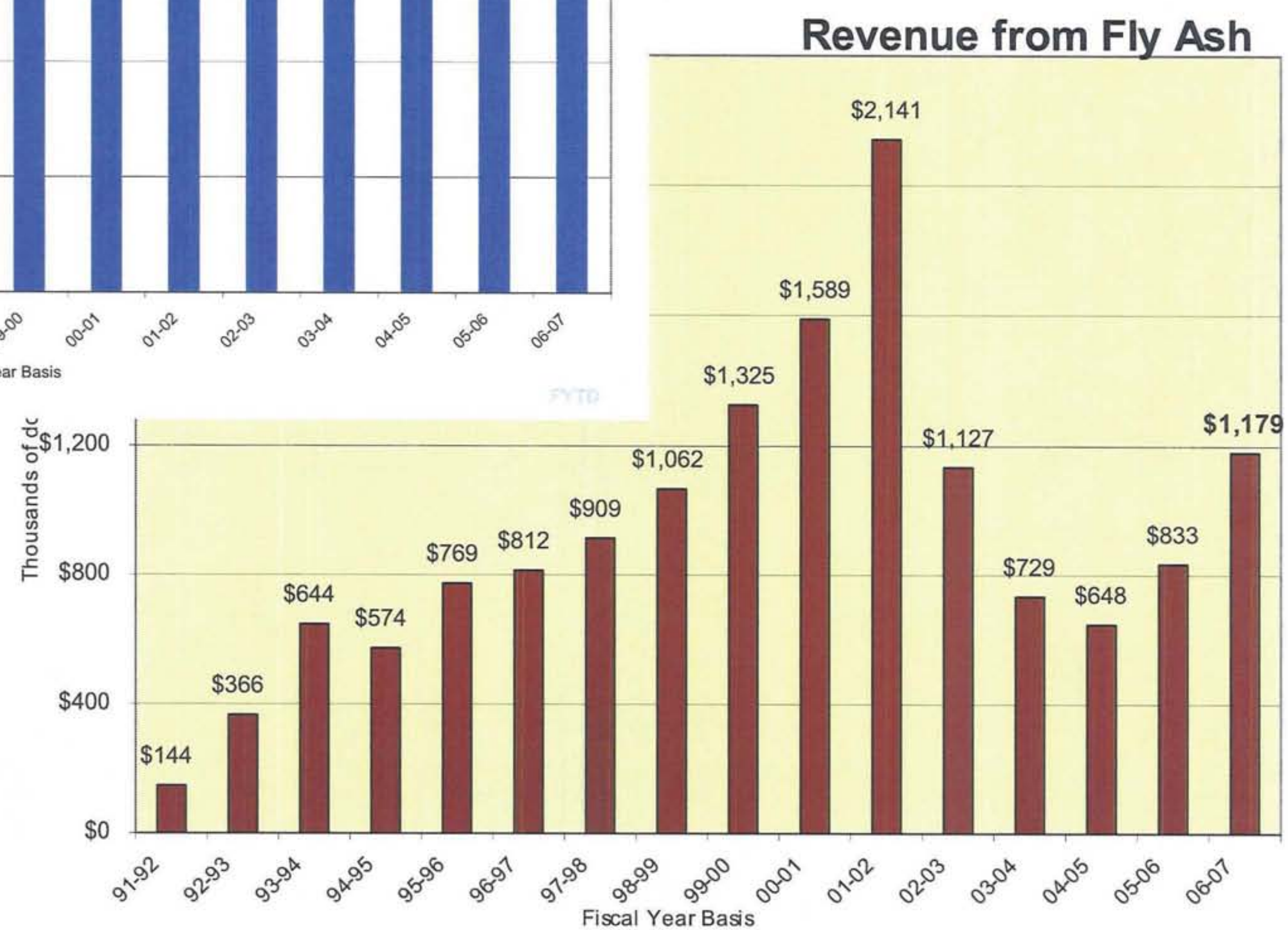
IP7020609

Operations Highlights

Fly Ash Sales

- Fly ash collection totaled **294,800** tons (FYE) averaging 24,600 tons/ month
- Revenue was $**1,179,000** plus eliminated fly ash handling costs
- Total Revenue to date $**14,851,000**


Headwaters Resources Fly Ash Removal
The annual guaranteed minimum volume is 200,000 tons
Thousands of Tons
300
250
200
150
100
50
0
57
99
112
106
123
154
151
188
237
250
170
223
215
232
295
92-93
93-94
94-95
95-96
96-97
97-98
98-99
99-00
00-01
01-02
02-03
03-04
04-05
05-06
06-07
Fiscal Year Basis


Revenue from Fly Ash
Thousands of dc
$1,200
$800
$400
$0
$144
$366
$644
$574
$769
$812
$909
$1,062
$1,325
$1,589
$2,141
$1,127
$729
$648
$833
$1,179
91-92
92-93
93-94
94-95
95-96
96-97
97-98
98-99
99-00
00-01
01-02
02-03
03-04
04-05
05-06
06-07
Fiscal Year Basis

IP7020611

OUTLINE

- Operations Highlights
- Maintenance Highlights
- Engineering Highlights
- Support Services Highlights
- Environmental & Water Issues

SHUTDOWN EVENTS SUMMARY:

Fiscal Year 2006-07

EVENTS SUMMARY:

Planned Outages: (1)

IGS MAJOR Outage	U1 completed	03/31/07- 4/29/07
IGS MINOR Outage	U2 cancelled	

Maintenance (unscheduled) Outages: (1)

Boiler- Main Steam Safety RV-8 Repair

Forced Outages: (13)

Boiler- Tube Leaks (2)
STS- DC system (2)
DCS/ Controls (6)
Generator (1)
Turbine (1)
Electrical (1)

TOTAL Shutdowns: 15

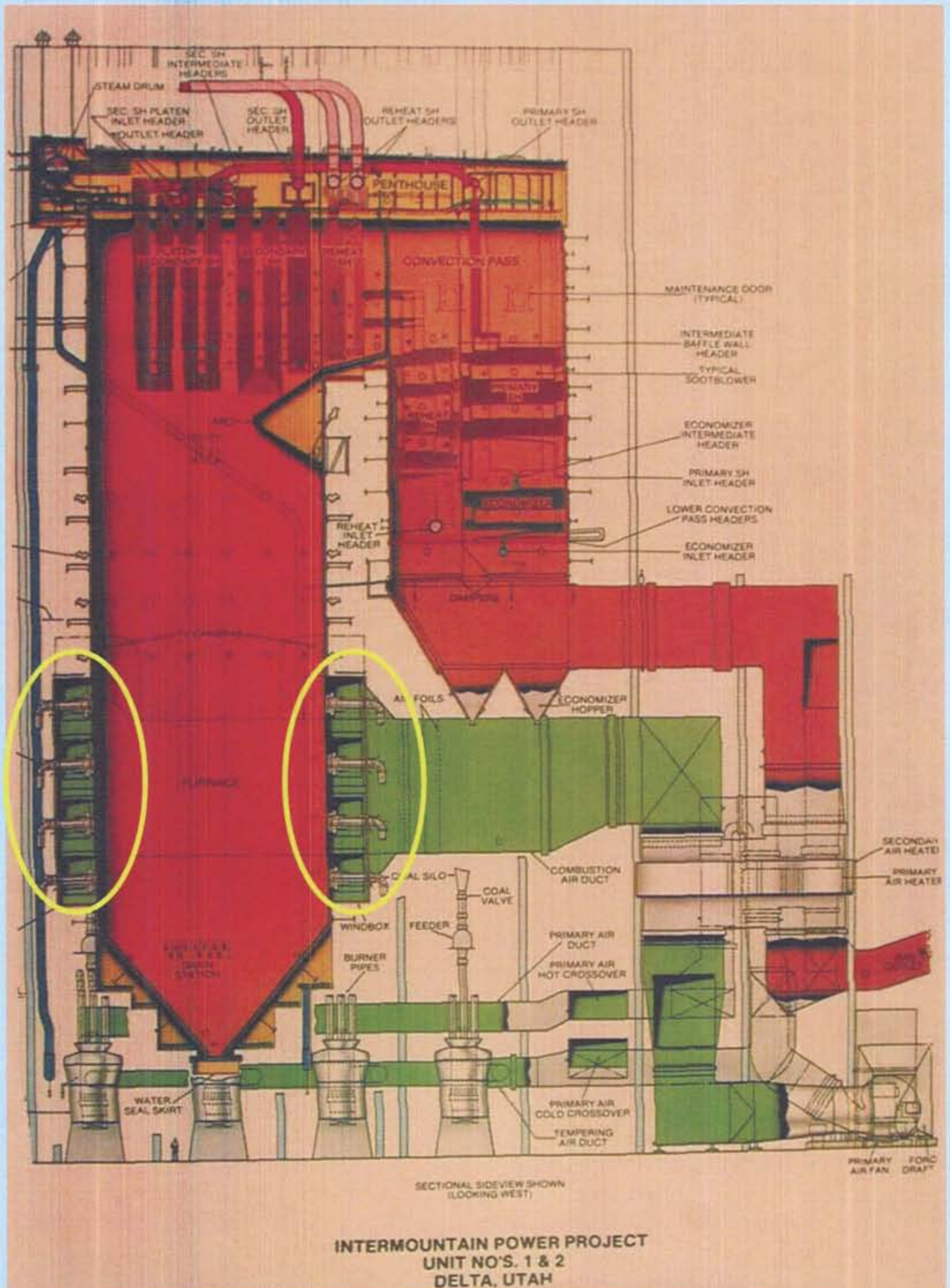
IP7020613

OUTLINE

- Operations Highlights
- Maintenance Highlights
- Engineering Highlights
- Support Services Highlights
- Environmental & Water Issues

Burners- Siemens & ABT

- Replaced original B&W 48 burners on U2 in 3/2004
- Burner line fire and erosion problems detected after 18 months of operation
- Working w/ Siemens-ABT to resolve
- Currently testing individual pulv- primary air flows (8)
- Next step, complete CFD model of burner (Siemens) to establish material design criteria, then order replacement burner components
- Points of Concern:
  - Primary Air Flow & Burner Line Velocity
  - Coal Flow Erosion
  - Nozzle Tip Cracking

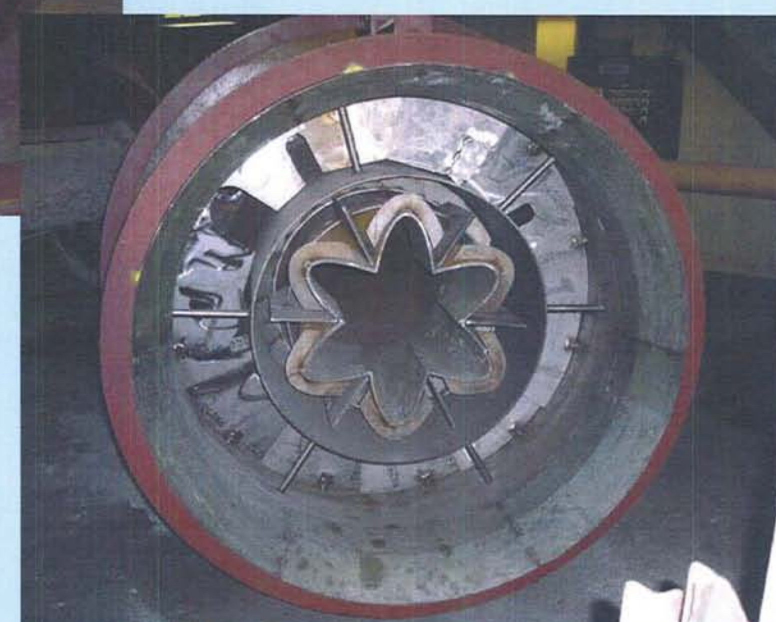


BURNERS, low NOx- 48 total
Configuration- 8 rows of burners.
Opposed fired- 4 front wall, 4 rear wall.
Each row of burners supplied from one pulverizer.
Each burner row has 6 burners across.

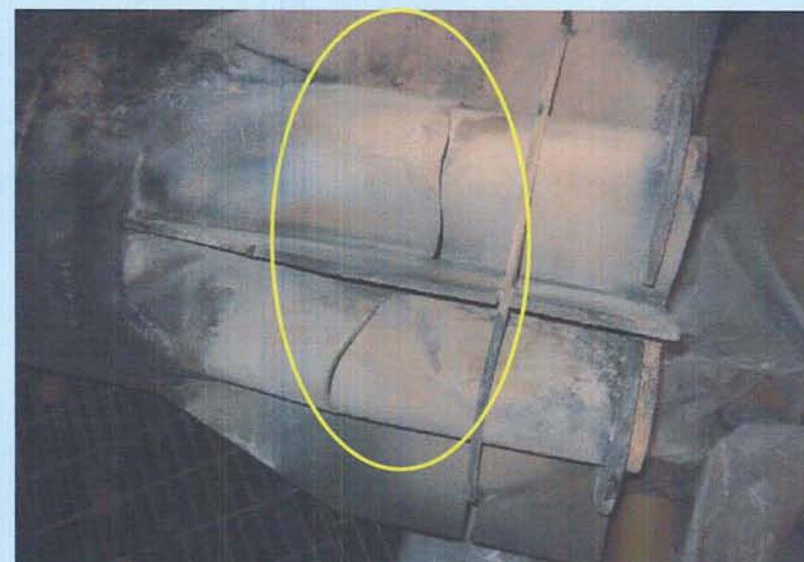
IP7020616

Replacement Burners- ABT design

New condition-
before installation



Replacement Burners- ABT



OUTLINE

- Operations Highlights
- Maintenance Highlights
- Engineering Highlights
- Support Services Highlights
- Environmental & Water Issues

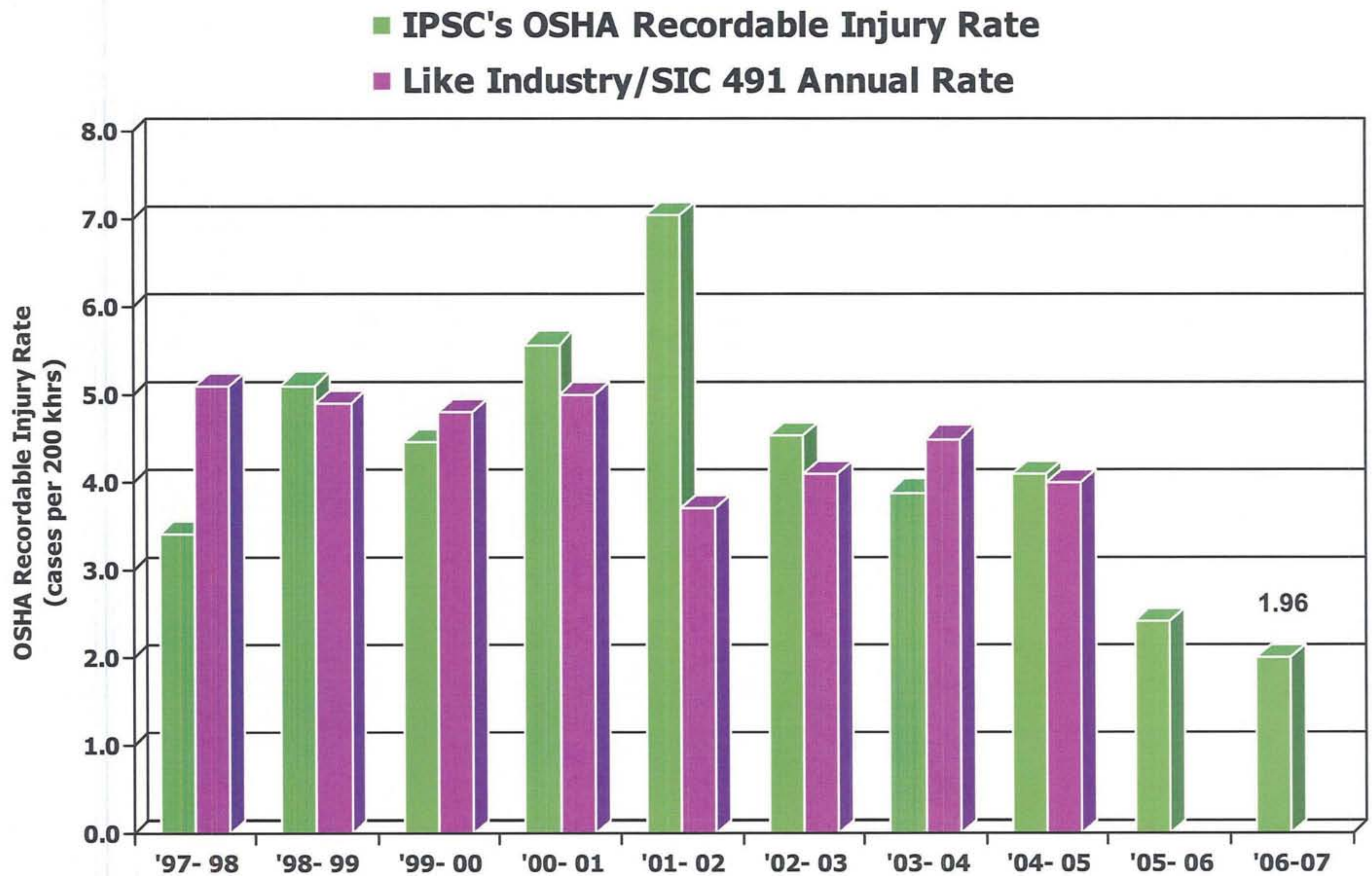
Support Services Highlights

- Safety Statistics (thru June 2007)
- Staywell Program Accomplishments

Safety Statistics (thru June 2007)

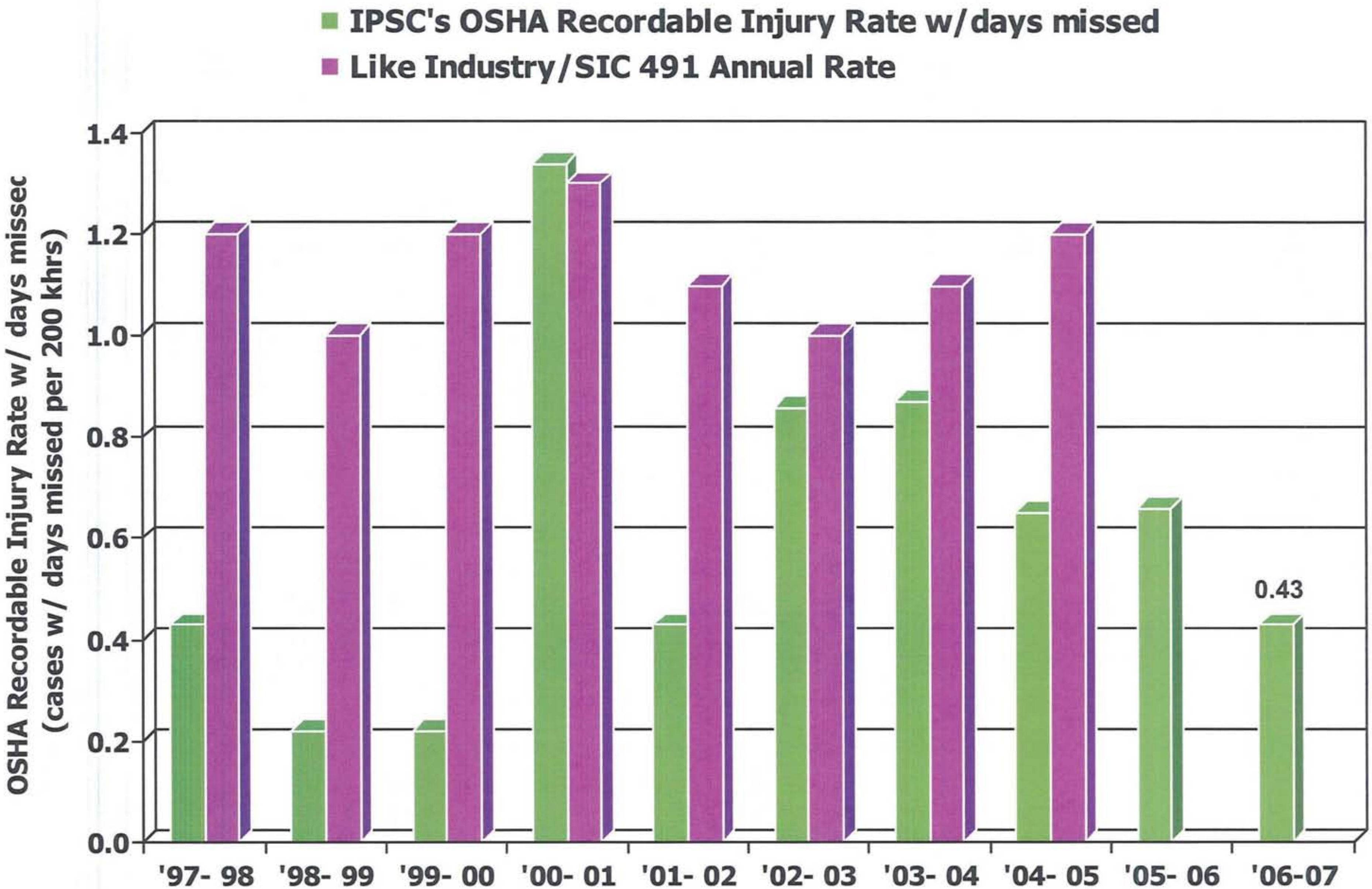
- OSHA Recordable Injury Rate= 1.96
  (cases per 200,000 hrs worked)
- OSHA Recordable Injury Rate w/days missed= 0.43
  (cases with days missed per 200,000 hrs worked)

OSHA RECORDABLE INJURY RATE-HISTORY



IP7020622

OSHA INJURY RATE W/ DAYS MISSED HISTORY

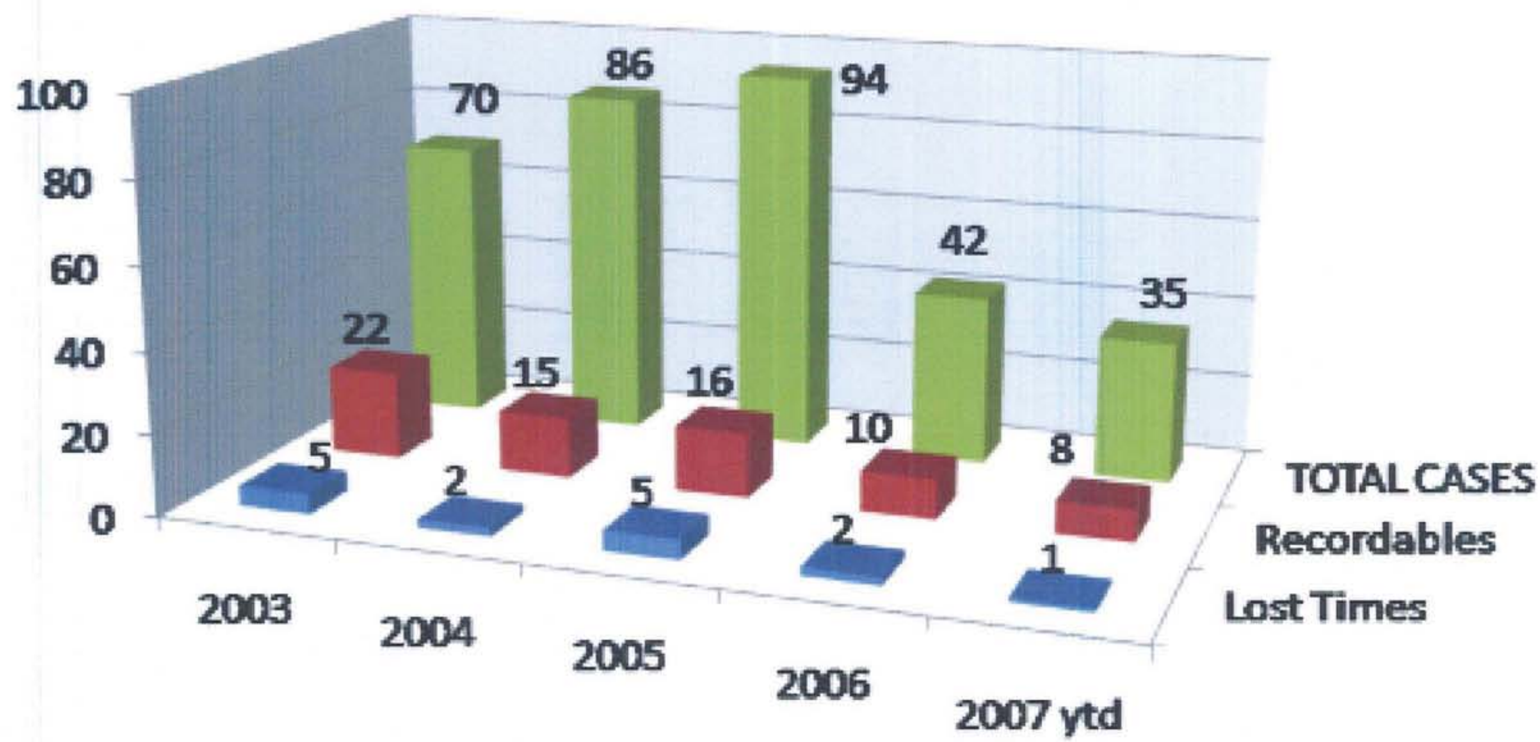


IP7020623

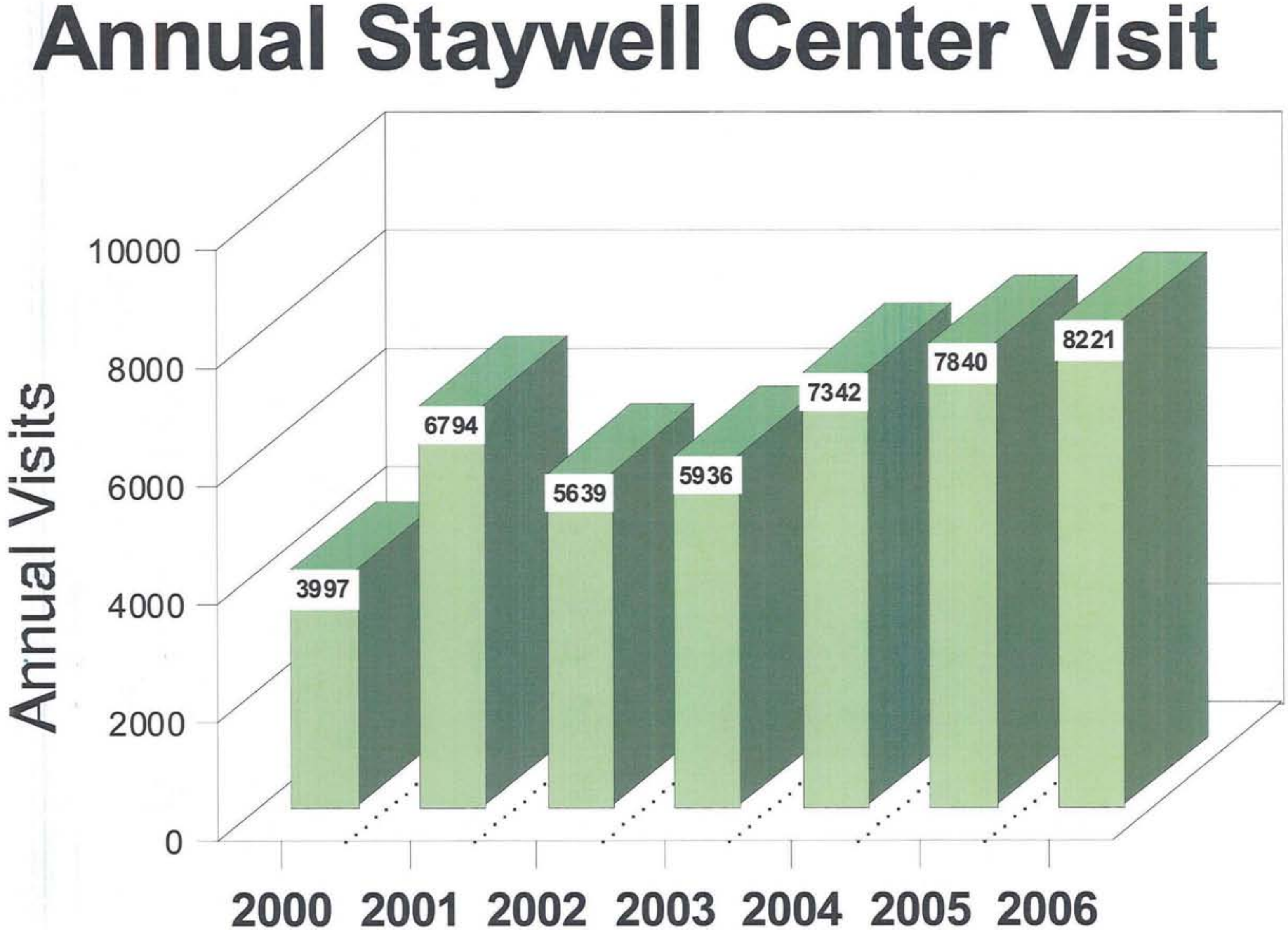
Supervising Safety Merit Program
Implemented January 1, 2003

Total Cases on File

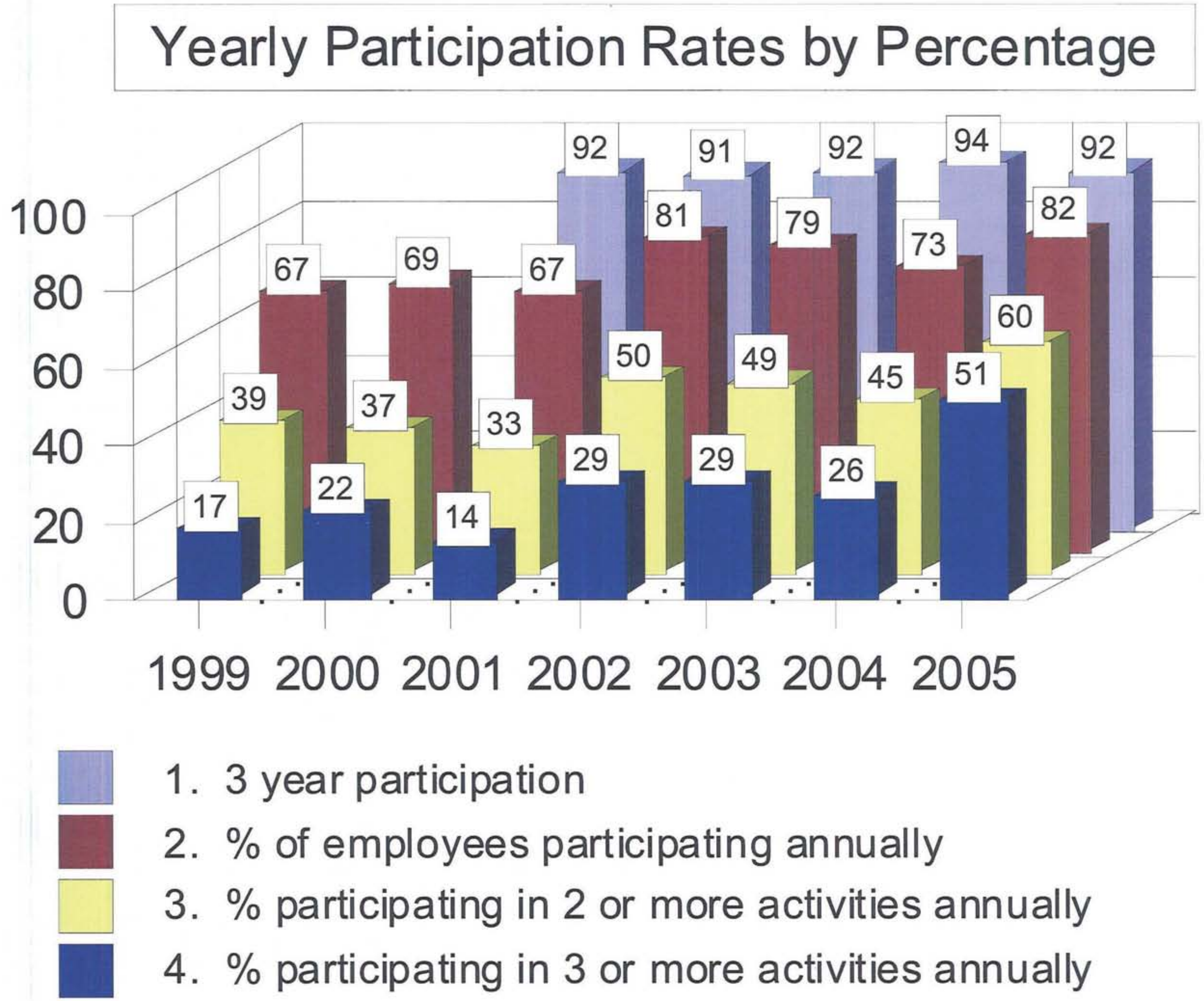
Comparing Total Recordable and Total Lost Time Incidents Per Year



Staywell Program Accomplishments

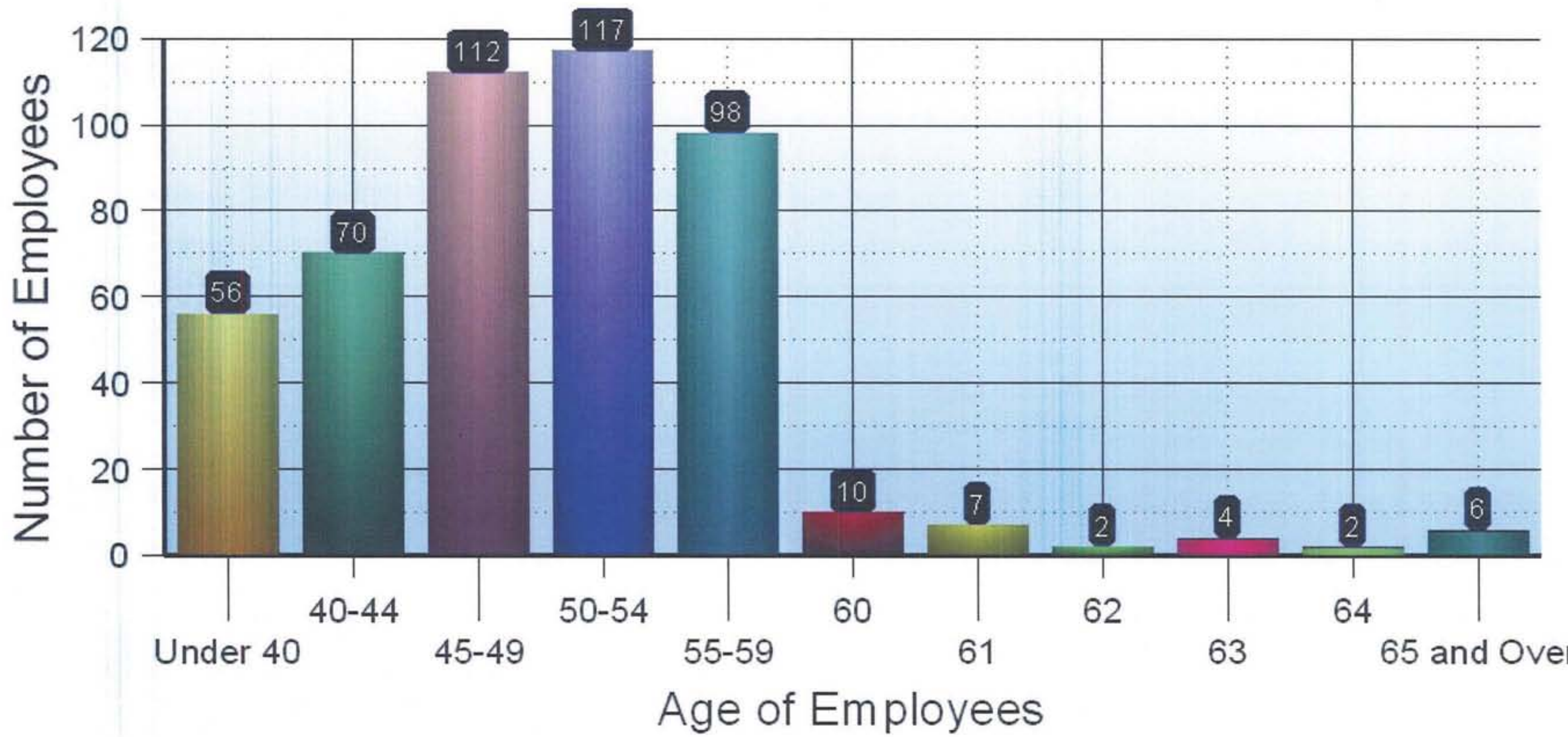


IP7020625


Yearly Participation Rates by Percentage
100
80
60
40
20
0
92
91
92
94
92
67
69
67
81
79
73
82
39
37
33
50
49
45
60
17
22
14
29
29
26
51
1999
2000
2001
2002
2003
2004
2005
1. 3 year participation
2. % of employees participating annually
3. % participating in 2 or more activities annually
4. % participating in 3 or more activities annually

IP7020626

Intermountain Power Service Corporation



Assume Retirement Age 62

Number of Employees expected to retire in 5 Years 83

Number of Employees expected to retire in 10 Years **200**

As of February 9, 2007

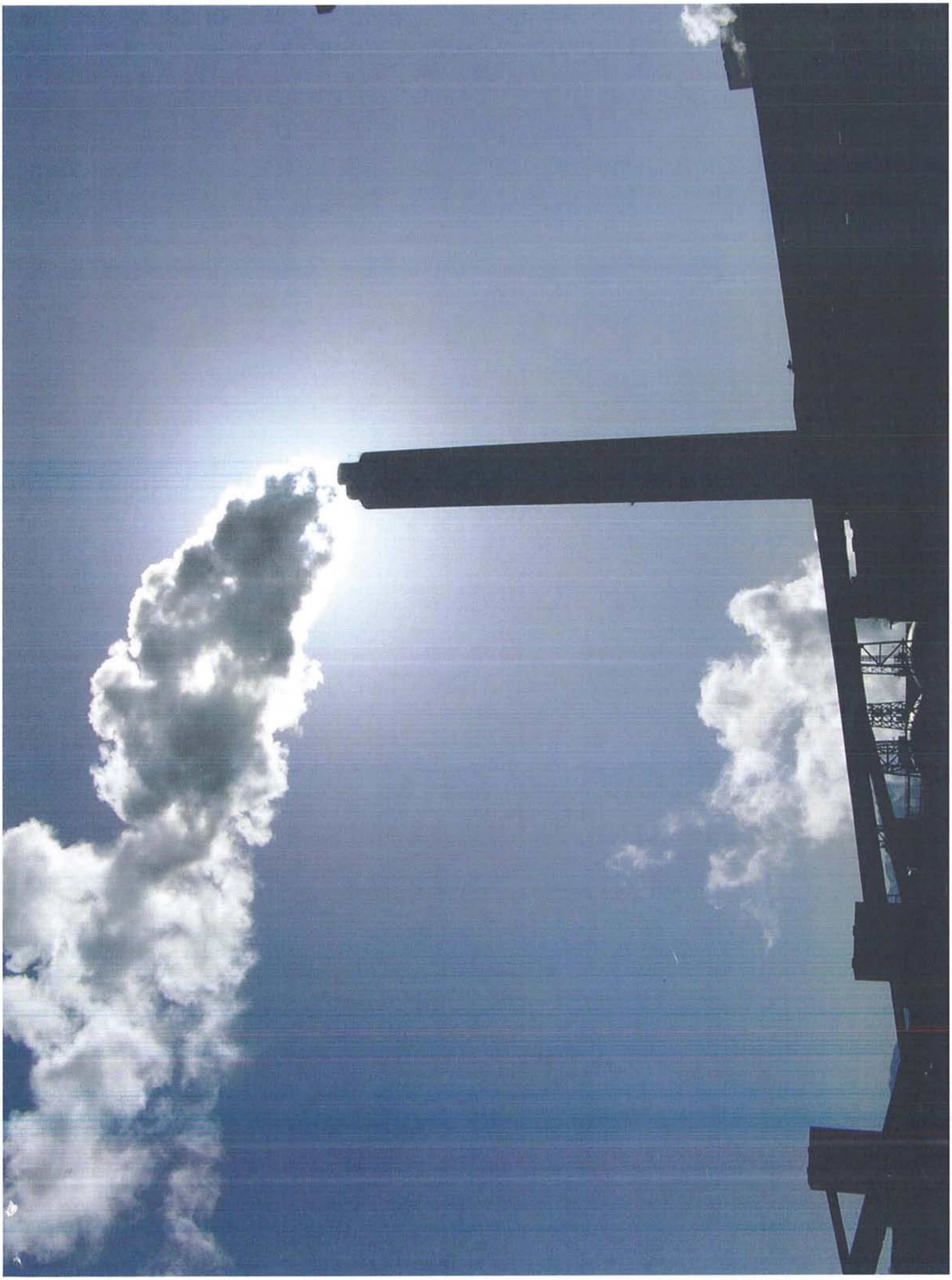
IP7020627

OUTLINE

- Operations Highlights
- Maintenance Highlights
- Engineering Highlights
- Support Services Highlights
- Environmental & Water Issues

Environmental & Water Issues

- **Annual Title V Operating Permit**
  - permit submitted for renewal (5 yr basis)
- **New Mercury Rules**
  - install mercury CEMS analyzers
  - proposed annual emission allowance caps
  - proposed max emissions rates and removal rates
- **Dept of Homeland Security New Rule**
  - determination of high-risk chemical facilities
- **Groundwater Discharge Permit**
  - bottom ash pond systems appear to be leaking
  - conduct sampling & modeling and submit source
  - assessment report & compliance action plan
  - drill additional wells and pump water back to pond



IP7020630

IPSC

-vs-

ABT

31

Status of ABT Dispute
October 17, 2007

1. IPSC and Siemens has agreed that the new injector should be modeled at 269,000 lbs/hr primary air flow. This is very similar to the number we had on our letter to ABT on November 13, 2006 which was 259,428 lbs/hr.

   a. Siemen's testing had primary air flow 8% high maximum

   b. IPSC testing had primary air flow around 4% high, which we have corrected

2. Siemen's stated that their material testing showed that all of the cracks originated from the eroded and thinned areas of the nozzle. Primary failure mechanism was erosion and not overheating.

   a. IPSC has not argued this point with Siemen's but, we still believe some of the cracking came from overheating of the nozzle. We have sent off a sample to Thielsch Engineering for an independent analysis.

   b. This issue may go away if Siemen's modeling shows overheating and they address it in a redesign with improved cooling to the nozzle tip.

3. We get the impression from Bob Allen that Siemen's believes ABT incorrectly used the 210,000 lbs/hr for primary air flow but, they also believe we should have stated the design point clearly in the specification and not used a curve.

4. We have not heard much from Siemens since they started the design review. We have supplied any information they have requested in a good faith effort to resolve this issue without litigation. All information they have sent has been slow because it is getting legal review by their attorneys.

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May 11, 2007

Mr. George W. Cross
Intermountain Power Service Corporation
850 W. Brush Wellman Road
Delta, Utah 84624-9546

FOR SETTLEMENT PURPOSES ONLY

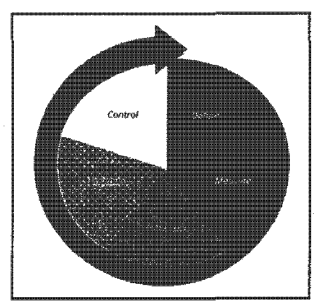
Subject: Update on Intermountain Power Service Corporation Unit #2 Burner Investigation

Dear Mr. Cross,

As previously discussed, Siemens intends to begin an investigation of the performance of the ABT burners at IPSC's Unit #2. The purposes of this investigation is to determine what (if any) recommendations may be made to address performance, particularly in light of the parties' desire to amicably settle the disputes that have arisen. Siemens agreed to undertake this evaluation in recognition of Intermountain Power as a valued customer, and not because of any obligation or liability. Intermountain Power, in turn, has agreed to suspend actions on the litigation it recently filed against Siemens and ABT, to allow the parties to conduct this investigation and potentially consider settlement options as a result.

Siemens plans on generally following the guidelines of Six Sigma, which may include some or all of the following five steps:

<u>Methodology</u>



- **Define** the process improvement goals.
- **Measure** the current process and collect relevant data for future comparison.
- **Analyze** to verify relationship and causality of factors. Determine what the relationship is, and attempt to ensure that all factors have been considered.
- **Improve** or optimize the process based upon the analysis using techniques like Design of Experiments.
- **Control** to consider and address variances.

The Investigation is in the Define stage. No conclusions are to be formulated in the Define stage of a Six Sigma program.
One of the primary outputs of the Define stage is a definition Statement. We have an agreement with ABT on a preliminary definition.
Our next step is to meet with IPSC personnel. In this meeting we will brief IPSC on the effort to date. We will present the preliminary Definition Statement with the intent of obtaining agreement and finalizing this step in the Six Sigma Process. Once the definition statement has been agreed upon, we can develop the next stage of the investigation. We would like to arrange a meeting between Mr. Allen, our Project manager and the IPSC staff during the week of May 14. Mr. Allen arranged the previous meeting through Mr. Garry Christensen. We would like to know if this next meeting should be arranged through Garry, or should there be another person as the primary contact.

The goal of this investigation is to produce a process driven option to address burner performance. We are working toward a schedule that supports the installation of a final design during the Spring of 2008. If you have any questions or concerns, please do not hesitate to contact myself (407) 736 - 4258 or Mr. Robert Allen (407) 736 – 2867.

Respectfully,

Thomas A Cochran

Thomas Cochran
Siemens Power Generation Corp.
Boiler Technology Services
4400 N. Alafaya Trail
Orlando, Fl 32826

From: Jerry Finlinson
To: joel@advancedburner.com; Sal Ferrara; Tarkel Larson
Date: 6/27/2005 12:03 PM
Subject: unit 2 ABT burner fire photos
Attachments: U2 F3 burner damage 6-25-05 002 sm.jpg; U2 F3 burner damage 6-25-05 011 sm.jpg; U2 F3 burner damage 6-25-05 012 sm.jpg; U2 F3 burner damage 6-25-05 016 sm.jpg; U2 F3 burner damage 6-25-05 018 sm.jpg; U2 F3 burner damage 6-25-05 020 sm.jpg; U2 F3 burner damage below 6-25-05 008 sm.jpg

CC: Dean Wood; Howard Hamilton; James Nelson; Jon Christensen; Phil Hailes

Joel and Sal,

This past weekend, 25 June 2005, we had a burner fire one of the new unit 2 ABT burners F3. It happened during the time that we were starting up unit 1, so the unit 2 operator was over at the unit 1 control board and didn't notice the alarm from the thermocouples that we had installed in the burner. Both the coal pipe and nozzle tip thermocouple went above 1600F.

As you can see from the attached photos, damage was extensive. The inner coal pipe has melted out the bottom and there is a slag pile inside the burner. The nozzle appears OK. The burner elbow heated up cherry red and flaked off the paint. The thermocouples and temperature switch were melted. A hole is burned through the back of the burner, so we can look right through the windbox wall into the back of the burner.

We'd like you to work with us to determine the cause of the burner fire and any possible preventive measures. Also what will be required to get it repaired. Do we need to replace the burner completely, or could it be repaired in position.

Let's also address the issue with the thermowell and how to make the thermocouple readings more reliable.

I recall you saying that there had never been a burner fire in this burner design.

Thanks, Jerry

Jerry Finlinson, Engineer
Intermountain Power Service Corp
850 West Brush Wellman Rd
Delta, UT 84624
435-864-6466 fax 0776/6670
jerry-f@ipsc.com

From: Jerry Finlinson
To: Sal Ferrara
Date: 6/30/2005 4:08 PM
Subject: Unit 2 ABT burner fire Elbow photos
Attachments: U2 F3 burner Elbow 6-30-05 011.jpg; U2 F3 burner Elbow 6-30-05 009.jpg; U2 F3 burner Elbow removed 6-30-05 016 sm.jpg; U2 F3 burner 6-30-05 005 sm.jpg

CC: Bill Morgan; Dean Wood; Howard Hamilton; Joel Vatsky; Jon Christense...

Sal,

Thanks for the feedback. Today our mechanics removed the burner elbow from the F3 burner. I have included some photos of the elbow. It shows one side of the fuel distributor to be melted off. We'll pull another one of an see if it also shows some damage.

We had set our burner thermocouples to alarm at 1350 on the nozzle tip. Four of them are going high for a few minutes several times per day, so we are going to raise them to 1500F. We are trying to determine if it is some electrical noise or a real temperature increase. So far it seems to be real. We'll let you know if we find anything definitive.

It appears that the secondary air register assembly inside the burner is also melted on the bottom, so we'll likely require an entire new burner. Phil and Dean will work out the details with you.

Thermowell issues. At the very beginning, you designed two thermowells into the burner at our request. It was a 3/8 inch tube with a 1/4 inch thermocouple. However, your manufacturing made the thermowells with two 45 degree bends in each one as per the drawing. It was impossible to insert the 1/4 inch thermocouples around those bends. So we worked with Tarkel to order 1/16 inch diameter thermocouples. They are still difficult to insert, partly because they bend easily and are hard to push. So we are proposing to install a new straighter thermowell in to the nozzle tip. We need your assistance to determine the best routing for the thermowell, so that we can insert it without any bends.

On the coal pipe body readings some of our thermocouples have read low by 100 to 200 degF. We are theorizing that maybe the thermocouple is not bottomed in the thermowell, but are not sure.

Thanks, Jerry

Jerry Finlinson, Engineer
Intermountain Power Service Corp
850 West Brush Wellman Rd
Delta, UT 84624
435-864-6466 fax 0776/6670
jerry-f@ipsc.com

>>> "Sal Ferrara" <sal@advancedburner.com> 6/30/2005 12:18:54 PM >>>
Jerry,
Based on the pictures the fire seems to have started either in the coal pipe or at the burner inlet. Where the coal pipe penetrates the floor grating, in vicinity of the burner shutoff valve, seems to have been subject to overheating in addition to the fire damage to the back of the fuel injector.

At this point the items we would recommend investigating is the primary airflow and burner shutoff damper position history prior to and around the time either the tip or body thermocouple temperatures rose above the normal operating temperatures. We know from our testing experience in Spring 2004 that the plant experienced problems with burner shutoff valves randomly going closed while the burner was in service (this is potential for causing fire in coal pipe or fuel injector). Also see if any abnormal PA flow of shutoff damper conditions could be correlated with temperature excursions on other burners (Dean Wood mentioned in phone discussion that there are some other burners that experience repeatable high temperatures excursions @ once or twice per day).

Also at first available outage, the plant should remove an elbow on one, or several, burners that experience periodic temperature excursions to inspect ABT's elbow fuel distributor, fuel injector barrel and burner shutoff valve for signs of overheating. I do not know how your temperature alarm is configured however it would be best if triggered by a rate of temperature change, rather than a specific temperature limit. If a rate of change logic is not utilized for the alarm, then we would recommend setting the alarm point @ 100 degree F above the temperature measured during normal operation.

We are working on providing a price for complete burner replacement. If the secondary air register assembly is OK you may only need to replace the fuel injector assembly, although you most likely need an outage to pull the fuel injector and inspect the burner to determine this.

You also mentioned the thermowell and making the thermocouple reading more reliable. I am not sure what this means, since I am not aware that there has been a temperature measurement reliability issue on either the fuel injector tip or body readings. Please provide more detail on this.
Sal

-----Original Message-----
From: Jerry Finlinson [mailto:Jerry-F@ipsc.com]
Sent: Monday, June 27, 2005 2:03 PM
To: joel@advancedburner.com; sal@advancedburner.com; tarkel@advancedburner.com
Cc: nelsonj@compassminerals.com; Dean Wood; Howard Hamilton; Jon Christensen; Phil Hailes
Subject: unit 2 ABT burner fire photos

Joel and Sal,
This past weekend, 25 June 2005, we had a burner fire one of the new unit 2 ABT burners F3.
It happened during the time that we were starting up unit 1,
so the unit 2 operator was over at the unit 1 control board and didn't notice
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Thanks, Jerry

Jerry Finlinson, Engineer
Intermountain Power Service Corp
850 West Brush Wellman Rd
Delta, UT 84624
435-864-6466 fax 0776/6670
jerry-f@ipsc.com

This message scanned for viruses by CoreComm

From: "Sal Ferrara" <sal@advancedburner.com>
To: "Garry Christensen" <Garry-C@ipsc.com>
Date: 10/28/2005 8:32:59 AM
Subject: RE: The remaining pictures

Thanks Garry.
The entire fuel injector assembly can be unbolted from the burner cover plate and removed as one piece (with inner zone damper and fixed vane spinner attached. We will provide our recommendations and an arrangement drawing for discussion on design for upgrading fuel injector & elbow design to a longer wear life. The pictures and descriptions you provided are very helpful in that respect.

In response to Dean's phone question yesterday morning, the fuel injector was designed based on the OEM Mill "Present Curve" (see email attachment) for full load, with one mill out of service. Based on the curve the burner design point is 62 MCFM PA flow @ 102 MLB/hr coal flow. Operating at higher flow rates than designed will result both in degrading performance as well as increase wear.
Sal

-----Original Message-----
From: Garry Christensen [mailto:Garry-C@ipsc.com]
Sent: Thursday, October 27, 2005 5:33 PM
To: sal@advancedburner.com
Subject: The remaining pictures

Sorry about that, the remaining pictures are attached. Are the nozzles replaceable and if so can they be removed with the tip attached? Also, what other components need to be unattached?

We do want you to look into a ceramic lined coal barrell/nozzle with a different engineered tip. ie less angle and modification of the X-vane. I hope you will be able to come out soon and sit down and discuss the issues so we can come up with a game plan and get needed parts/new equipment in time for April's outage.

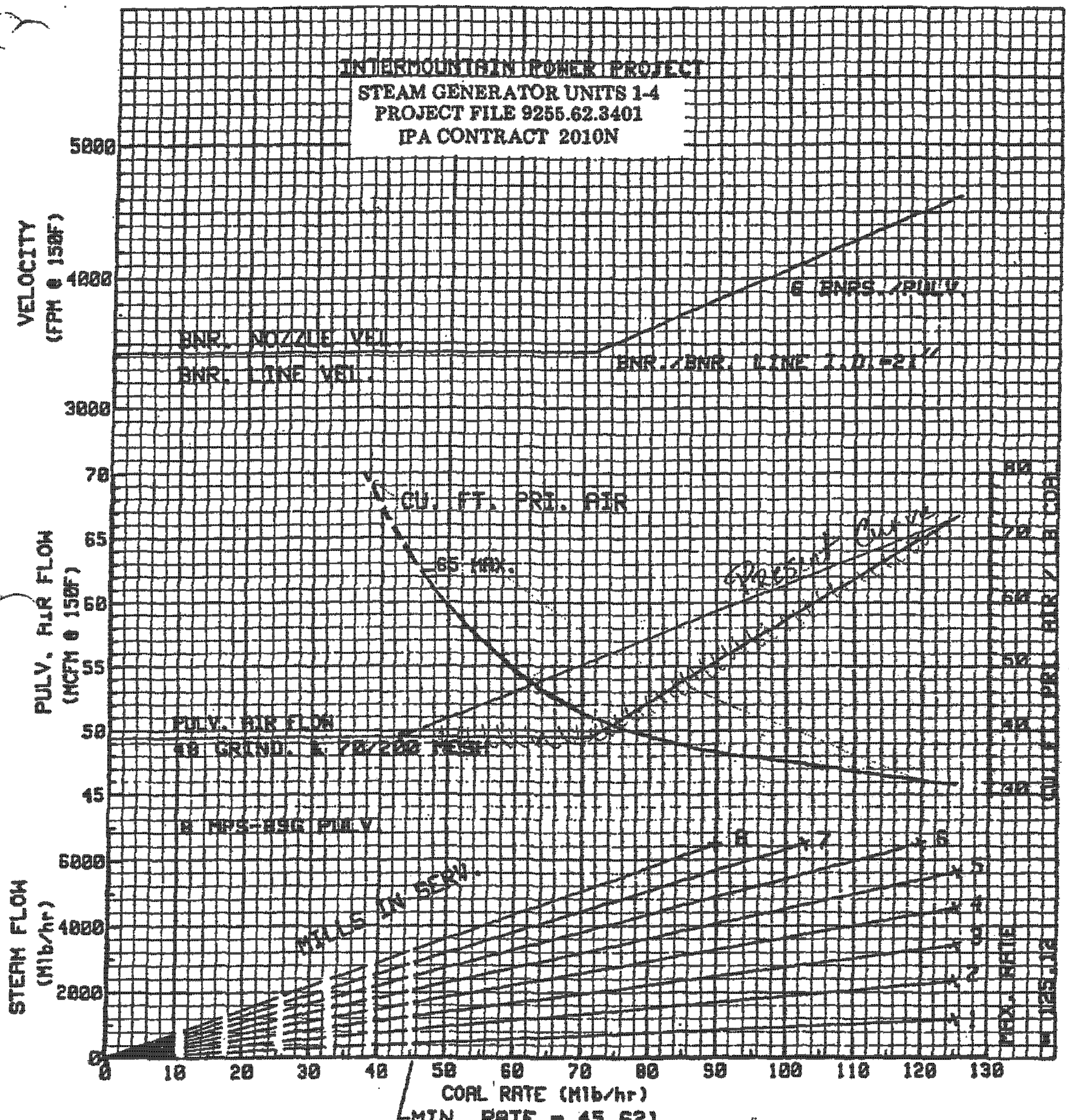
This message scanned for viruses by CoreComm

CC: "Dean Wood" <Dean-W@ipsc.com>

PG 896-4

Babcock & Wilcox

CONTRACT INFORMATION SHEET



THESE CURVES ARE SUBMITTED FOR THE PURCHASER'S CONVENIENCE AND THE PERFORMANCE INDICATED THEREON SHALL NOT BE OFFERED BY THE COMPANY OR CONSTRUED BY THE PURCHASER AS A PROPOSAL OR CONTRACT OBLIGATION.

DRAWN BY	DATE	APPROVED BY	DATE	A.O.
J. NEIDERT	2-1-82	RBH	2-5-82	

REL. NO. AND DATE	CONTRACT NO.	FILE NO.
1 9-8-82	334-0614	RB-614

TITLE — PULVERIZER-BURNER COORDINATION CURVES - COAL (B) CIS— 101.05

Babcock & Wilcox
a McDermott company

Power Generation Group
3535 S. Platte River Drive
Unit G-3
Sheridan, CO 80110
(303) 761-3388
FAX: (303) 761-1219

August 13, 1998

Mr. Gary Christensen
Intermountain Power Service Corporation
850 West Brush Wellman Road
Delta, Utah 84624

Re: MPS-89G Standards
RB-614/5

Dear Gary,

After our telephone conversation today, I thought it would be appropriate to follow up on a few of the items we discussed. As you know, the 16 B&W pulverizers at your plant are the MPS-89G. The base standard design for this model is as follows:

Base Capacity as Fired (tons/hr)	68	
(70% thru 200 mesh, 50 HGI)		
Base Air Flow (lbs/hr)	239,000	237300
(27 cu.ft. per lb of coal, full load only)		
Base Outlet Air Flow (cfm)	61,200	
(150° F, 30 in HG)		
Grinding Table Speed (rpm)	25.5	
Diameter of Rolls (inch)	70	
Width of Rolls (inch)	24	
Seal Air Requirements (lb/min)	137.3	

If you have any further questions, please feel free to contact me.

Sincerely,

BABCOCK & WILCOX COMPANY

22.2
+ 4.7
≈ 60 IN MILL PRESSURE

Robert W. Wewer
District Engineer

RWW:dz/847
cc: J.B. Doyle, Denver Sales

2.8
253

IP7020642

From: "Moen, Noel S" <nsmoen@babcock.com>
To: "Garry Christensen" <Garry-C@ipsc.com>
Date: 10/24/2007 7:01 AM
Subject: RE: CIS Curve

Garry,

As we discussed on the phone, your current measurement of primary air flow is by mass flow on the mill inlet duct with the measuring device. This is an acceptable method and preferred for measuring and controlling primary air flow and consequently for setting up a loading curve for the mill. Specifically, your B&W 89G mills are designed for 239,000 #/hr primary air flow when the mill is at maximum capacity. Obviously, with coal lower than 50 HGI, the 136,000 #/hr maximum grinding capacity has to be adjusted. In general, the maximum grinding capacity degrades 2% for every point below 50, down to around 30 HGI (after which the correction is not linear).

Mill outlet CFM can conveniently calculate burner line velocity, and has been shown on previous CI Sheets. To convert from mass flow to CFM, we use the mass flow at the measured point and use temperature and barometric/static pressure at the alternate point to get volume flow. For instance, a general correction would take the barometric pressure for the plant elevation, measure static pressure and temperature at the mill outlet, and get an actual density of the air at the mill outlet. With the measured mass air flow at the inlet, the outlet volume is then determined.

Hopefully this answers your question.

Regards, Noel

-----Original Message-----
From: Garry Christensen [mailto:Garry-C@ipsc.com]
Sent: Tuesday, October 23, 2007 11:34 AM
To: Moen, Noel S
Subject: CIS Curve

Noel, sorry to keep bothering you but we need you to show us how to convert from the attached mill curve MCFM say at the top pulverizer flow 66.500 mcfm to lbs/hr. We are looking at this for our site. Thanks

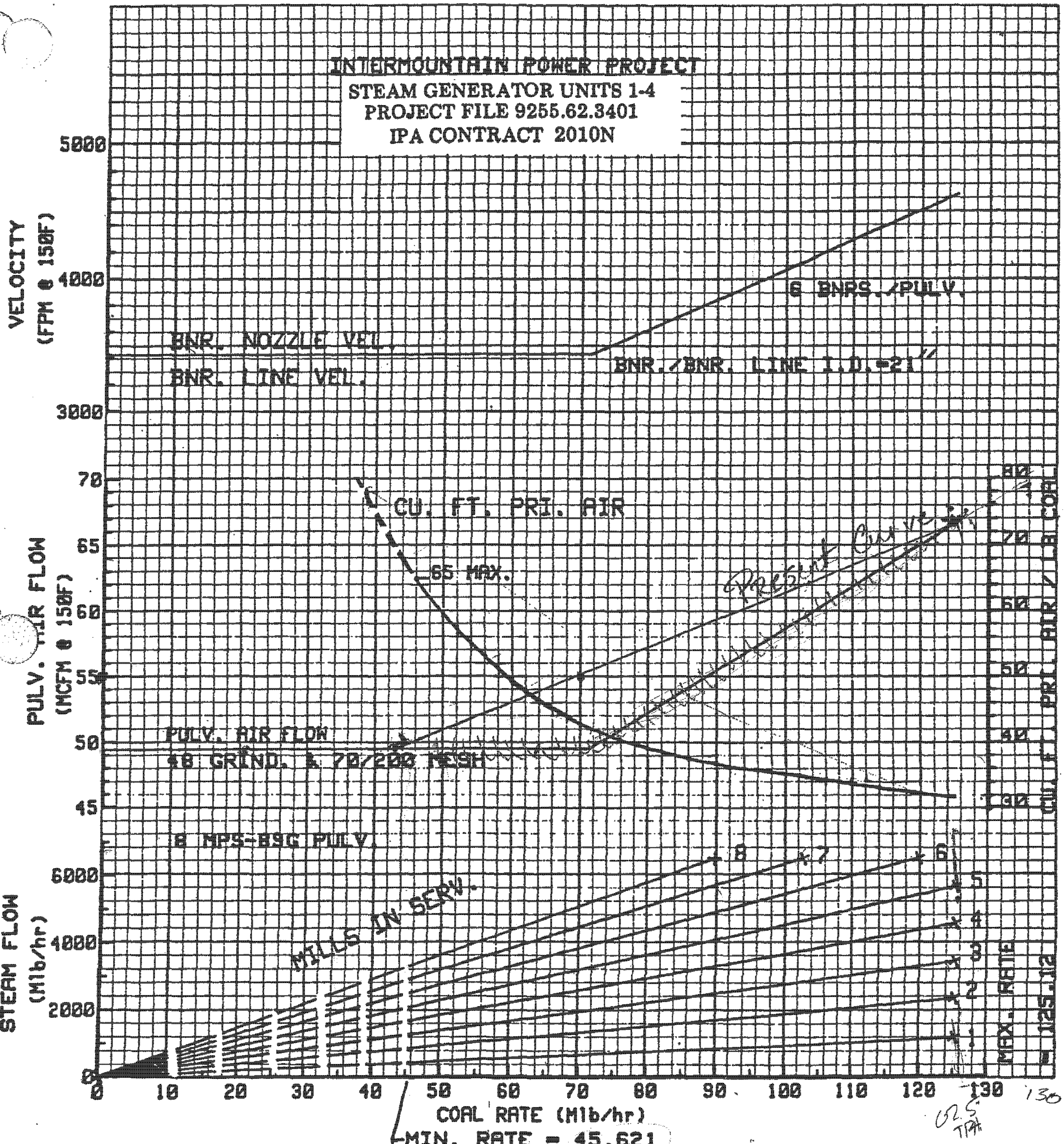
Intermountain Power Service Corp.
Performance Engineer
850 W. Brush Wellman Road
Delta, Utah 84624-8546
garry-c@ipsc.com (mailto:garry-c@ipsc.com)
Telephone (435) 864-6486

This message is intended only for the individual or entity to which it is addressed and contains information that is proprietary to The

PG 896-4

Babcock & Wilcox

CONTRACT INFORMATION SHEET



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DRAWN BY	DATE	APPROVED BY	DATE	A.O.
J. NEIDERT	2-1-82	RGLP	2-5-82	

REL. NO. AND DATE	CONTRACT NO.	FILE NO.
1 9-8-82	334-0614	RB-614

TITLE — PULVERIZER-BURNER COORDINATION CURVES - COAL (B)

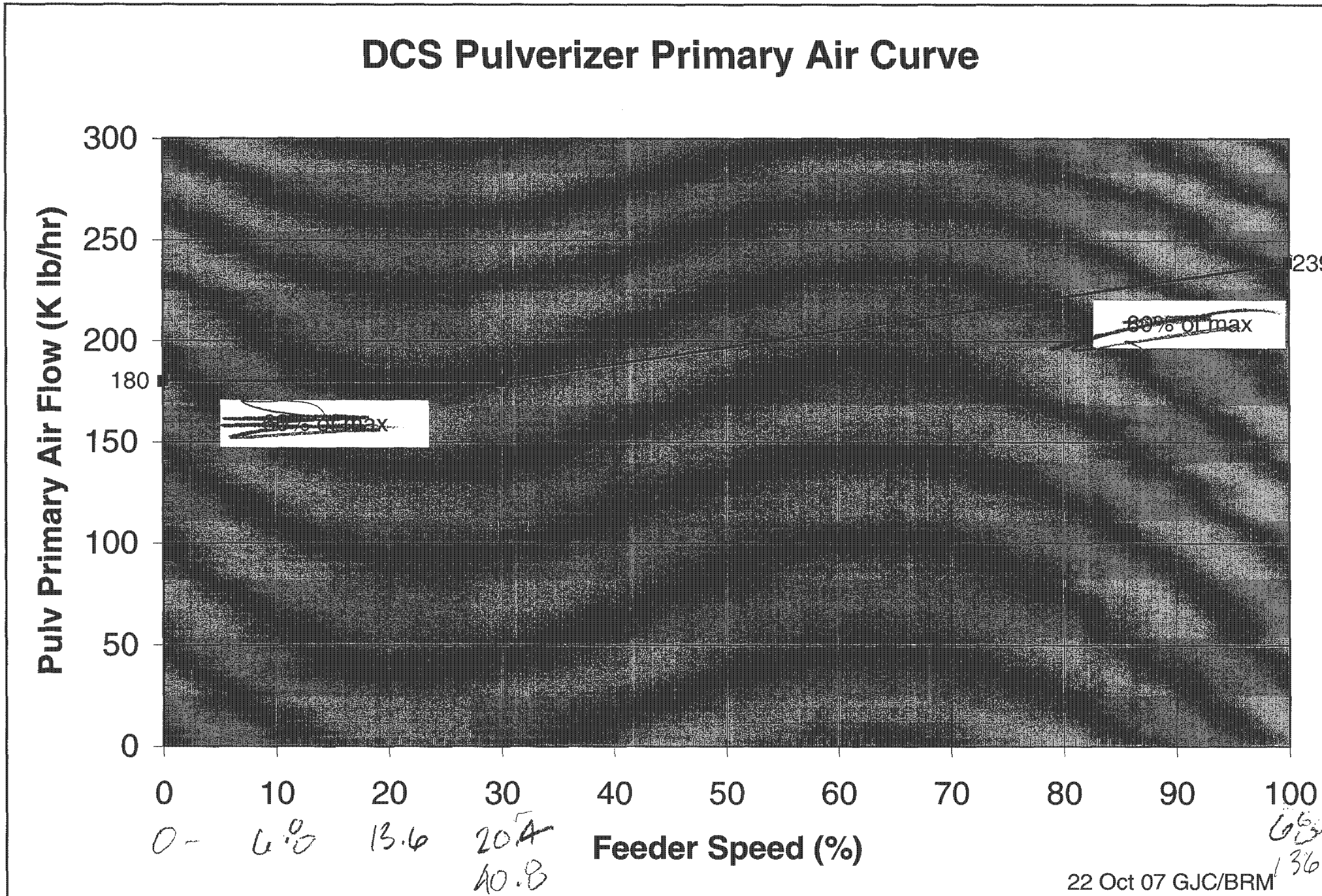
CIS— 101.05

IP7020644

From: Garry Christensen
To: Dean Wood; Jerry Hintze
Subject: Cost of fuel injector back in 11-05

During the meeting on 11-10-05 ABT offered the following:

Fuel Injector 24 @ $36,300 each plus and additional 12.5% discount if ordered within a time frame
48 @ $34,600 each plus and additional 15.0% discount if ordered within a time frame
Total for 48 fuel injectors $1,660,800 with discount 15% $1,411,680


DCS Pulverizer Primary Air Curve
Pulv Primary Air Flow (K lb/hr)
300
250
200
150
100
50
0
180
239
~~80% of max~~
0
10
20
30
40
50
60
70
80
90
100
Feeder Speed (%)
0 -
6.8
13.6
20.4
40.8
136
22 Oct 07 GJC/BRM

$\cancel{40.8} = 1$

$180 = 40.8x + y$

$239 = 180x + y$

$y = 239 - 186x$

$180 = 40.8x + 239 - 136x$

$-59 = -95.2y$

$x = -\frac{59}{95.2} = .62$

$y = 154.71$

2/2/07 CO
Express R/R

INTERMOUNTAIN POWER SERVICE CORPORATION

February 2 , 2007

Mr. Joel Vatsky
President
Advanced Burner Technologies
271 Route 202/206
P.O. Box 410
Pluckemin, NJ 07978

IPSC Demand Letter and Offer of Settlement

Dear Mr. Vatsky:

We appreciate your willingness to take you and your employee's time to meet and discuss the burner issues with us over the course of last year. At our last meeting in November, you based your claim that ABT was not responsible for the defective burners on the following:

1. IPSC is and was operating at a higher than calculated primary air flow.

2. IPSC did not perform pre-installation testing to verify air flow and balance as mandated in your proposal.

3. IPSC did not inform ABT of overheating problems with the previous B&W burners.

70 lbs 55 CFM
120 = 65.5 CFM

I address each of these points in turn below.

AK
1-920-4008

Primary Air Flow Calculation

At the meeting, you demonstrated how ABT calculated mass air flow:

Reading B&W curves at 6.9 million lbs/hr steam flow plus 5%, primary air flow yields the following:

Primary Air Flow = *66,500 ft^3/min @ 150 F°*

Converting to mass flow:

Specific volume of air @ sea level and 150 F°: 15.4 ft^3/lb
Altitude correction @ 4700 ft = 0.84

IP7020648

Specific volume of air@ 4700 ft and 150 F°= (15.4 ft³/lb)/0.84 = 18.3 ft³/lb

$$\textit{Mass Flow} = \frac{(66{,}500\ ft^3/min)(60\ min/hr)}{18.3\ ft^3/lb} = 218{,}032\ lbs/hr$$

It appears, however, that you made an error in your calculations. The following is the correct method for calculating mass air flow:

We agree with your interpretation of the B&W curve:

Primary Air Flow = 66,500 ft^3/min@150 F°

As you should know, however, B&W curves are based on mill outlet conditions at 150 F° instead of standard conditions. Therefore, the conversion to mass flow should be done, and should have been done by you, at mill operating pressure, which is approximately 29.92 inches of mercury absolute (atmospheric + mill pressure):

Density of air @mill outlet = P/RT

Where: P = Pressure
R = Gas Constant
T = Temperature, R°

Thus, Density = (2116 lbsf/ft^2)/(53.4ft-lbf/lbm-R°)(150 + 460) R°
= 0.065 lbm/ft^3

Specific Volume = 1/(0.065 lbm/ft^3) = 15.38 ft^3/lbm

$$\text{Mass Flow} = \frac{(66{,}500\ ft^3/min)(60\ min/hr)}{15.38\ ft^3/lbm} = \mathbf{259{,}428\ lbsm/hr}$$

Thus, your primary air flow calculation, upon which your faulty design was apparently based, is off by over 15%. This error was in no way IPSC's fault.

Pre-Installation Testing

Your proposal, Section 2.2, does say: "Th[e] primary air flow must be verified during pre retrofit testing." And Section 2.4, Testing, also says that IPSC will contract the following testing and analytical services that will be witnessed by ABT's service personnel: Pre-retrofit testing will be conducted within three weeks following contract award to verify the primary air flow to the inlet of all of the mills."

IPSC, however, never agreed to contract for any such pre-retrofit testing, and ABT never again pressed, or even raised, this issue with IPSC. More importantly, the Contract between IPSC and ABT, Part E, Div. E.1., Section 8, expressly says that "IPSC has no duty to . . . test" any

IP7020649

"specific materials, services, equipment, or other Work" unless "specifically provided in the Contract." Again, the Contract makes no mention of IPSC conducting pre-retrofit testing.

Moreover, that same provision also says that the "fact that materials, services, equipment, or other Work have or have not been inspected, tested, or accepted by IPSC, whether voluntarily or as required by any specific provision in the Contract, shall not relieve Contractor [ABT] of responsibility in case of later discovery of nonconformity, flaws or defects, whether patent or latent." Thus, even assuming IPSC should have contracted for pre-retrofit testing, ABT contractually assumed the risk of any nonperformance of such testing. The fact is that ABT was the designer and manufacturer of the burners and should have asked for or performed any testing that it foresaw, or should have foreseen, to be necessary to ensure the burners would operate as warranted and required by the Contract.

Finally, the Contract also says that "Contractor shall not be allowed to take advantage of any error, discrepancy, omission, or ambiguity in any document, but shall immediately report to the President and Chief Operations Officer, in writing, any such matter discovered." Clearly, if ABT believed IPSC should have contracted for pre-retrofit testing or pre-retrofit testing should have been performed in some other manner, ABT should have immediately notified me in writing. I never received any such notification.

Thus, given the plain language of the Contract and given that the "Contract Documents shall prevail over other information submitted with Contractor's Proposal," it is clear that ABT—not IPSC—bore all of the risks associated with nonperformance of pre-retrofit air flow testing. You certainly have no basis to pass that risk on to IPSC now that your burners have been found to be improperly designed and manufactured.

Overheating of the Nozzle

We still do not understand what you think we know or knew about nozzle overheating that we have not or did not tell you. The first set of B&W nozzles failed after 5-10 years of service from overheating. The nozzles failed at the welded axial seams, and the nozzles drooped because the carbon steel sections failed at the transition. This was corrected by purchasing cast nozzles, thus eliminating the seam, and by extending the alloy tip further back into the burner barrel. The nozzles you provided are also cast, meaning you already incorporated that change. The location of your transition from carbon to alloy steel is nearly in the same location in relation to the furnace wall as the existing longer B&W nozzles, so nothing in our experience would suggest changing that.

We have not, however, previously experienced the type of failure that we saw with your nozzle. So, there is nothing in our experience base that we could have told you to prevent the new problems. As far as we know, our boiler operates the same as any other B&W boiler of similar size and fuel. We did not know during the design of the burners, or know now, of any special conditions that would account for the problems with your design.

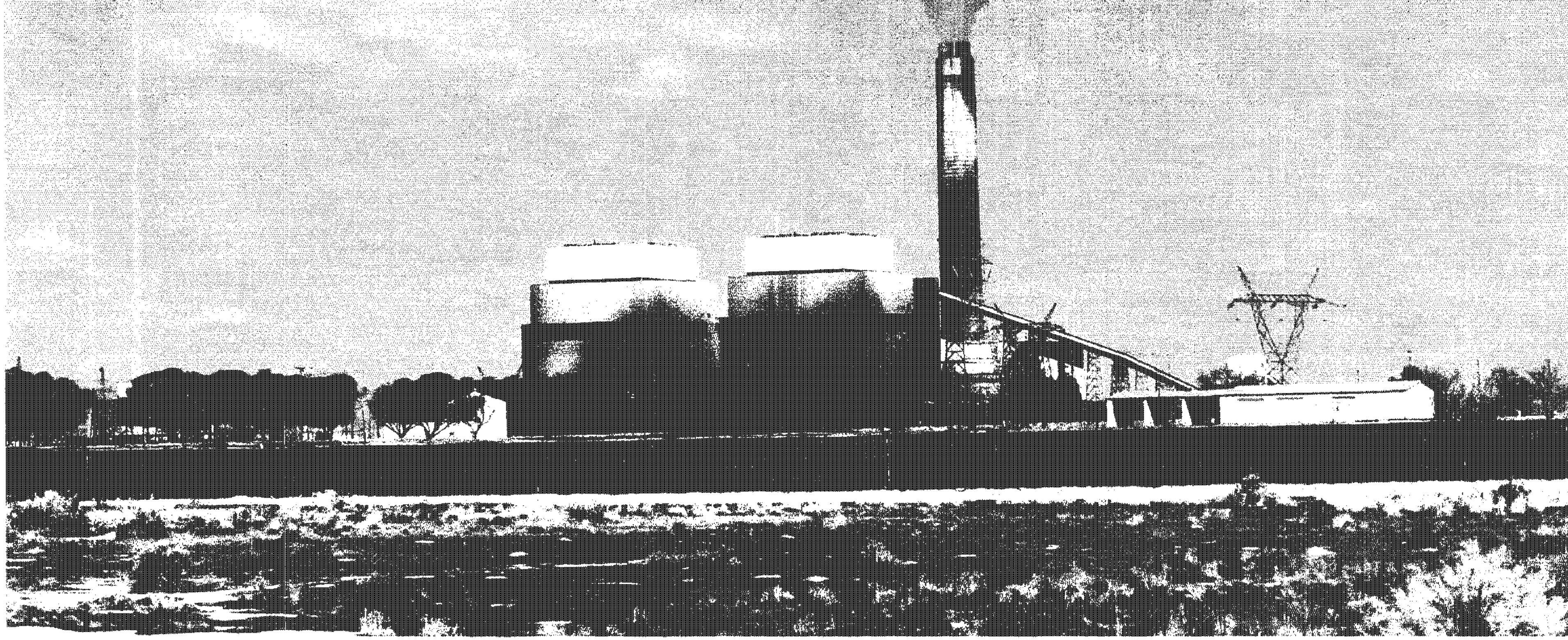
IP7020650

Intermountain Power Service Corp.
ABT Siemens Warranty Claim

SIEMENS

Unit #2 - 950 MW

Plant Location – Delta Utah



Date: October 17, 2007

IP7020651

ABT was awarded a contract in 2003 for the material supply of low NOx burners replacing existing B&W burners that had operated since 1992.

The base contract was for material supply only of 48 low NOx burners, 48 ABB Scanners plus air flow measuring equipment.

Approximately one year after commercial operation, the unit suffered a fire in one burner that destroyed the fuel injector. During the following Spring outage, Inspection revealed additional nozzles had cracks and excessive thinning of the fuel piping and nozzles.

April 2007, Siemens BTS and IPSC initiated a Six Sigma investigation to determine the root cause of the of the problems with the burners.

Siemens BTS and IPSC agreed on an issue statement with the five items:

1.) The alloy nozzle tip is cracking
2.) There is material loss at the following locations:
   - The burner nozzle tip
   - The "X" vane at the coal pipe elbow
   - The burner barrel
3.) The burner barrel is experiencing permanent deformation
4.) Establish the correct primary airflow for normal operation
5.) Definition of requirements for cooling air when the burner is out of service

IP7020652

SIEMENS

The Six Sigma Root Cause analysis followed the five steps for a Six Sigma Project

Define: clear definition of the problem and the aim of the project

During the define stage, all available correspondence was collected, contract documents were collected, the involved parties were interviewed and an Issue Statement developed and agreed to.

Measure: Examination of the current process and collection relevant data for future analysis

The ABT design records were reviewed, the existing pulverizer performance at IPSC was documented and metallurgical analysis of the cracked burner nozzle was performed.

Analyze: Evaluation of the measured results and identification of the actual cause of the problem

CFD analysis and thermal modeling of the nozzles using the operating parameters as measured during the pulverizer testing was performed. A root cause analysis was generated.

Improve: Selection and implementation of the solution

A new burner design was generated using the information collected during the Define and Measure stage and CFD analysis undertaken to verify changes will

Control: Control of the changed process

The differences between the original design and the revised design need to be implemented and documented

IP7020653

Executive Summary

The alloy nozzle tip cracking is the result of erosion of the wall thickness in the nozzle due to higher than original air and coal flow. The thinner wall section weakened the nozzle to the point that the nozzle could not accommodate the stress generated by the differential expansion between the stainless steel nozzle and the carbon steel barrel.

There is material loss at the burner nozzle tip, "X" vane at the coal pipe elbow and the burner barrel are a result of coal and air flows being higher than design plus stratification of the coal particles in the coal pipe entering the 90° elbow.

The burner barrel is experiencing permanent deformation due to higher than expected temperatures at the interface between the nozzle and barrel. The burner barrel will use a SS spool piece to extend back into the burner barrel.

Establish the correct primary airflow for normal operation – The plant has not been operating per the B&W mill performance curve supplied in the contract. The mill curve supplied in the contract did not reflect the revision by B&W in 1992. Also, the plant has been operating at higher seal air flows

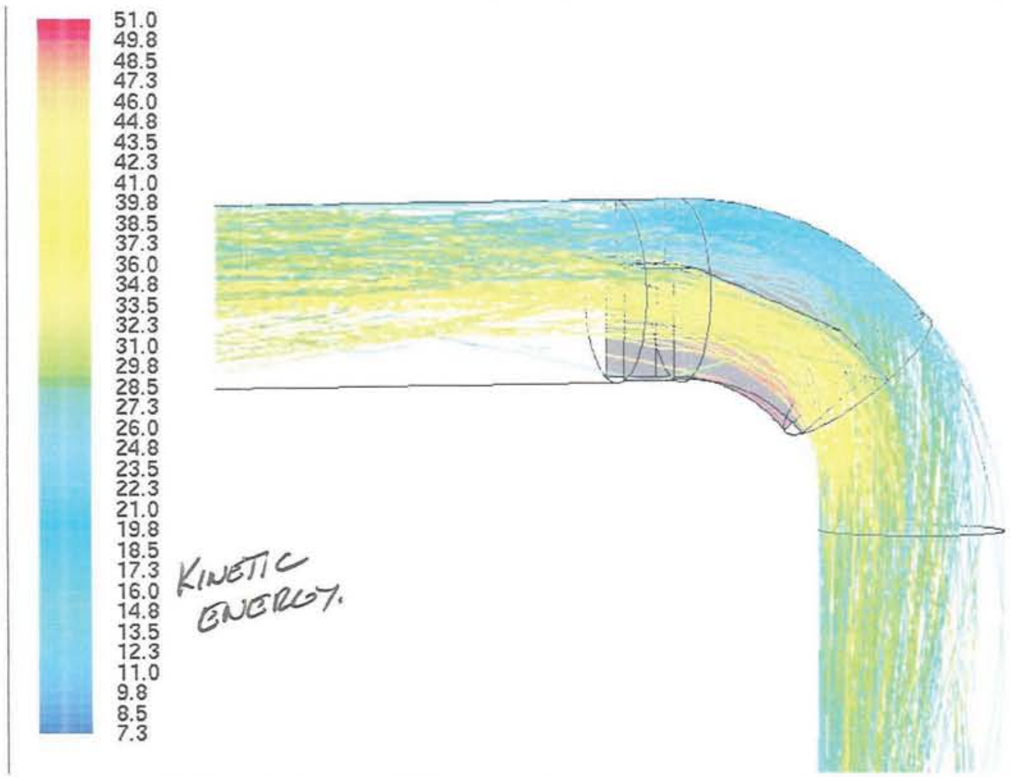
Definition of requirements for cooling air when the burner is out of service – the Operations and Maintenance manual will have to be revised to address out of service operation

IP7020654

Intermountain Power Service Corp
ABT Siemens Warranty Claim

SIEMENS

Erosion and Mill Air Flow



The CFD model shows the coal particles are stratified entering the elbow. The original kicker assembly with the X-vane that was modified to retain the clean out port will not last in the high velocity stream of concentrated coal particles with the higher coal flow.

The revised fuel injector design will increase the cross sectional area of the nozzle to reduce velocities, lengthen and flatten the slope of the transition ramp and replace the round elbow with a "Flat back" design to allow dispersion of the coal particles across the flow area of the nozzle.

IP7020655

SIEMENS

Erosion and Mill Air Flow

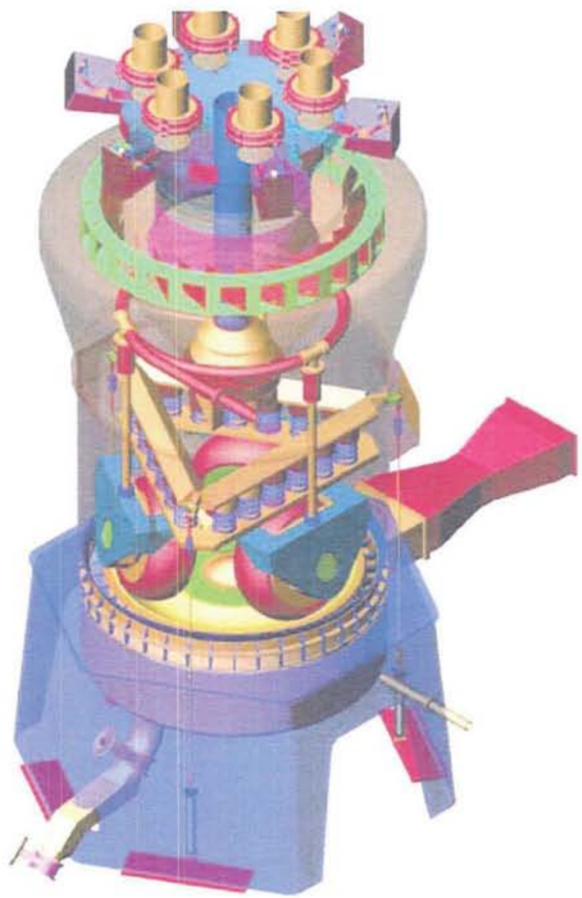
Erosion is originating at the transition slope from the round barrel to the 6 lobe exit. This is consistent with the results of the CFD model. The metallurgical analysis performed by Tordonato Energy Consultants identified erosion as a the contributor cause of the nozzle cracking. The high temperatures at the weld between the nozzle and burner barrel increased the stress which also contributed to the cracking. There was no evidence of corrosion.

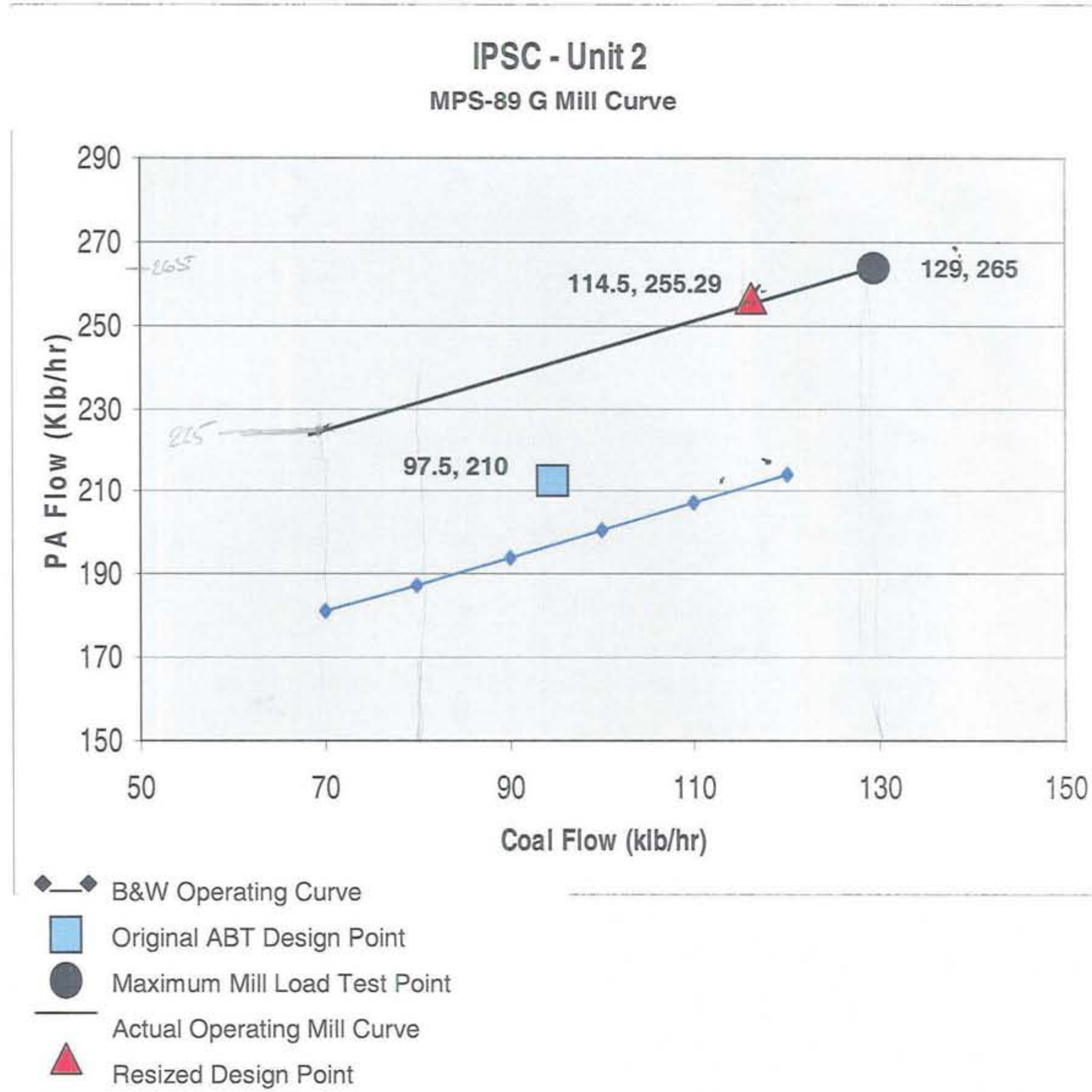
IP7020656

Intermountain Power Service Corp
ABT Siemens Warranty Claim

SIEMENS

Erosion and Mill Air Flow



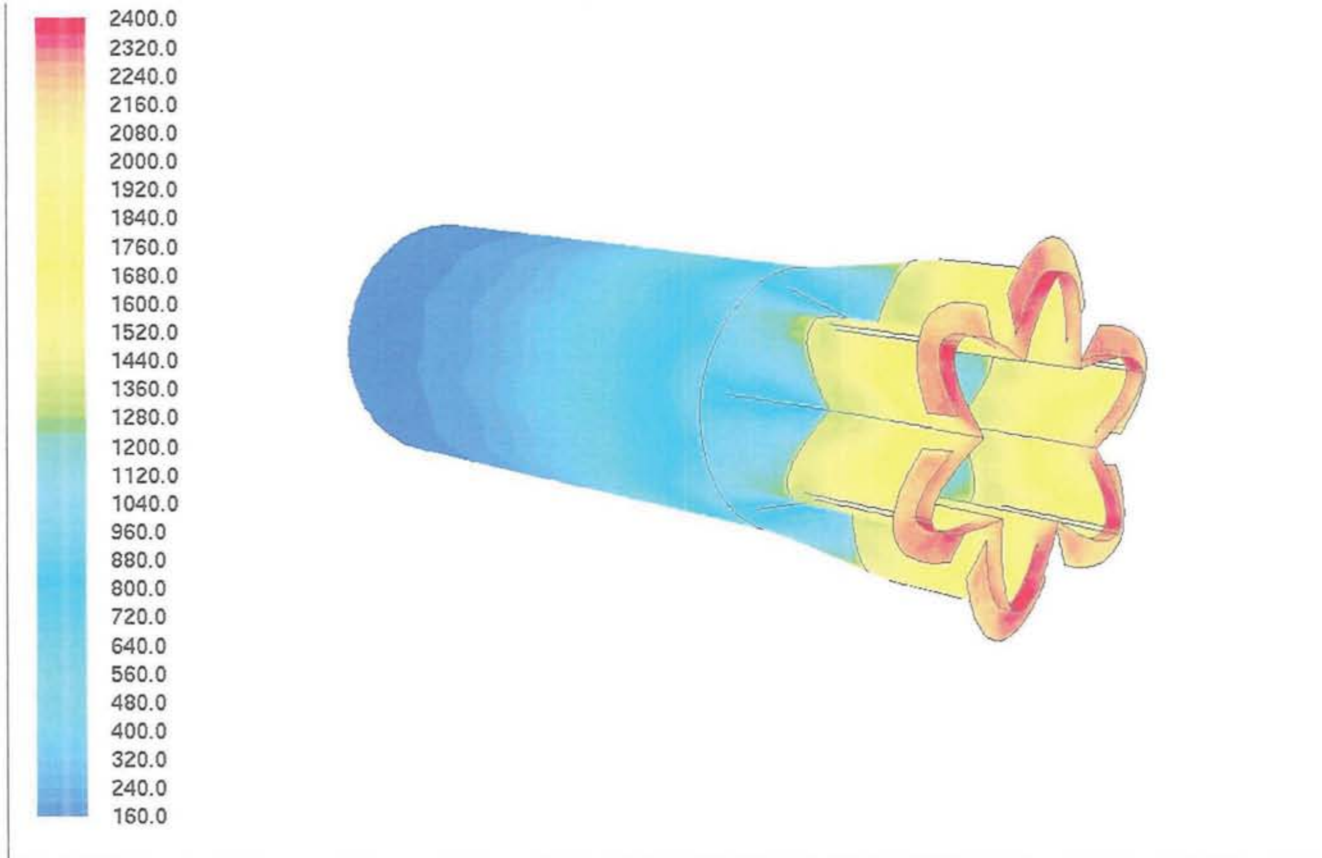


IP7020657

Intermountain Power Service Corp
ABT Siemens Warranty Claim

SIEMENS

Thermal Stress



Contours of Static Temperature (f)

Sep 26, 2007
FLUENT 6.3 (3d, pbns, pdf20, rke)

The furnace radiation model shows that the heat conducted back to the burner barrel to be higher than expected. The revised fuel injector will use a spool piece of 253MA stainless steel to make the transition from the nozzle to the barrel. The revised fuel injector shall use refractory tile to shield the burner barrel from radiation from the furnace and to minimize erosion. This thermal model does not model the cooling of the secondary air on the tip.

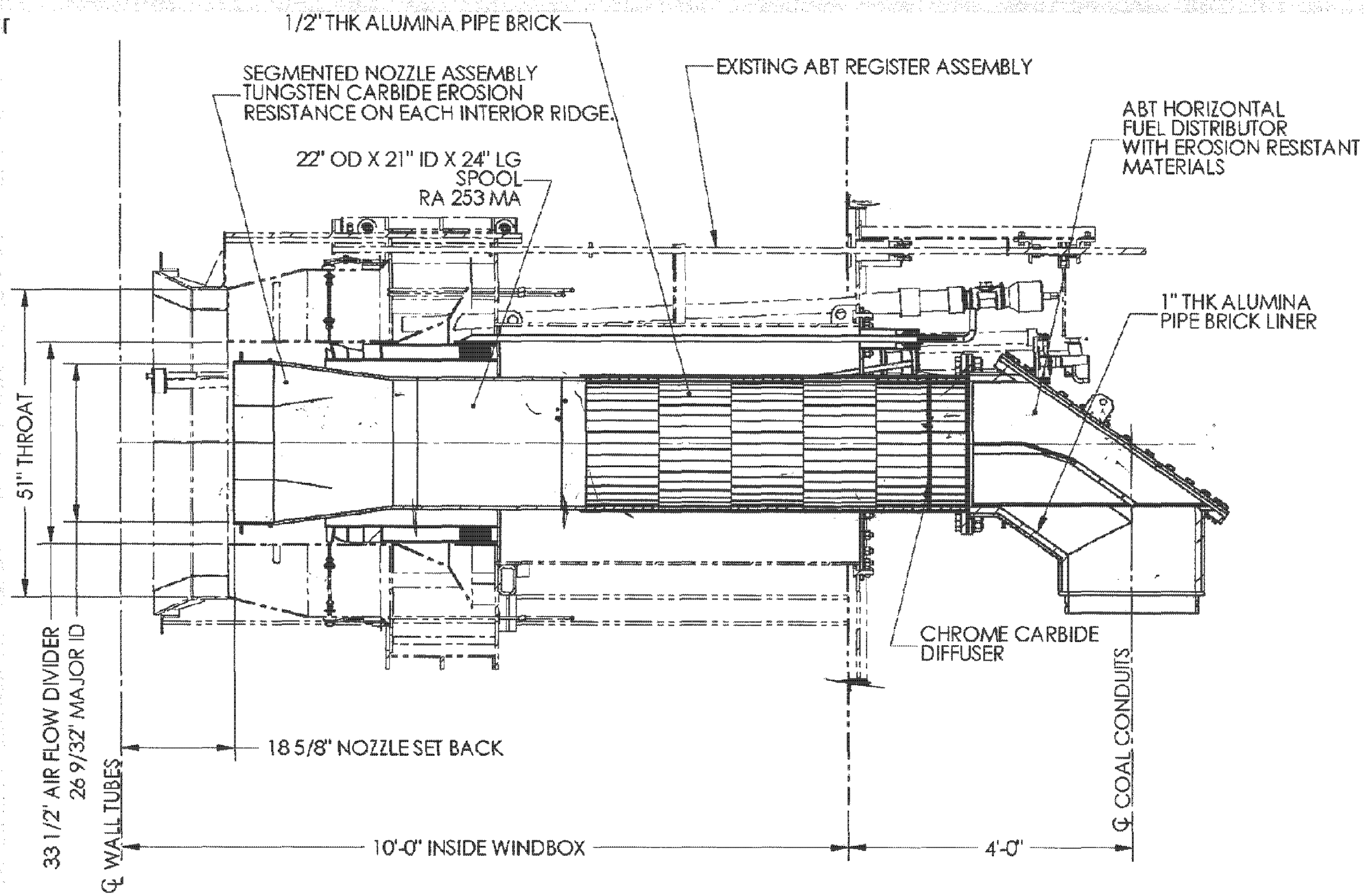
IP7020658

SIEMENS

Thermal Stress

The off line burners are plugging with slag indicating that furnace gases are back flowing into the nozzle area. This creates very high temperatures that the nozzles were not designed for. A minimum air flow required to prevent this must maintained.

IP7020659


1/2" THK ALUMINA PIPE BRICK
SEGMENTED NOZZLE ASSEMBLY
TUNGSTEN CARBIDE EROSION
RESISTANCE ON EACH INTERIOR RIDGE.
EXISTING ABT REGISTER ASSEMBLY
22" OD X 21" ID X 24" LG
SPOOL
RA 253 MA
ABT HORIZONTAL
FUEL DISTRIBUTOR
WITH EROSION RESISTANT
MATERIALS
1" THK ALUMINA
PIPE BRICK LINER
51" THROAT
CHROME CARBIDE
DIFFUSER
33 1/2' AIR FLOW DIVIDER
26 9/32' MAJOR ID
18 5/8" NOZZLE SET BACK
℄ WALL TUBES
10'-0" INSIDE WINDBOX
4'-0"
℄ COAL CONDUITS

IP7020660

Next Steps

Close Out Six Sigma Program

- Commercial agreement between IPSC and Siemens Power Generation Inc

- Agreement on Division of Responsibilities

IP7020661

Nov 5, 2005
Unit off for repairs, G2 and D2 elbows pulled.

Nov 7, 2005
New replacement burner for F4 arrived on-site

Dec 2005 - Jan 2006
Purchase from ABT - burner tip segment liners/diffuser/liner assembly in lieu of erosion liners $199,100.00

Feb 22, 2006
Email from Tom Shults (ABT) to Garry Christensen (IPSC)
IPSC pressure drop concerns - ABT agreement to remove kicker in elbow

Feb 28, 2006
Purchase from ABT - lot of ceramic brick $ 7,050.00

March 31, 2006 to April 29, 2006
Unit 2 extended outage - AP&F burner repair work release plus IPSC I&C work $282,219.64

April 4, 2006
Purchase from ABT - 6 cast SS throat segments $ 3,660.00

April 10, 2006
ABT Letter to IPSC - response to outage photos

April 12, 2006
Purchase from Power Industrial - Two 309 SS burner tips $ 4,570.00

April 17, 2006
ABT representative site visit - Tarkel Larsen

April 19, 2006
ABT Letter - Recommended Test Program regarding Burner Overheating

April 24, 2006
IPSC Letter to ABT - Request for Repair of Intermountain Generating Station Unit 2 Burners

May 6, 2006
ABT Letter to IPSC - Subject: Intermountain Generating Station Unit 2 Low Nox Burners, Contract 04-45606 IPSC April 24, 2006 Letter

July 31, 2006

IPSC Letter to ABT - Intermountain Generating Station Unit 2 Low NOx Burners Contract 04-45606: Response to ABT Letter Dated May 9, 2006

Aug 16, 2006

ABT Letter to IPSC - Intermountain Generating Station Unit 2 Low NOx Burners, Ref: Response to IPSC Letter Dated July 31, 2006

Nov 9, 2006

Site visit meeting ABT with IPSC - ABT Proposed Settlement

ABT Time line Nov 30, 2006

Sep 16, 2003

Contract Awarded to ABT	Burners	$2,237,415.00
	Installation	$1,616,800.00

Nov 12, 2003

Addendum to existing contract	253 MA material upgrade	$ 40,800.00
	Coal flow divider, X-vane spool	$ 40,800.00
	Air flow measurement components	$ 35,220.00

March 2004
Installation of new ABT burners

April-May 2004
Startup and testing of ABT burners

Feb 16,2005
Unit 2 short outage fireside burner inspection - minor cracking observed

25
June 5, 2005
Burner F4 fire - burner isolated

July 2005

New replacement burner purchase from ABT	$107,150.00

Sept 6, 2005
IPSC letter to ABT - Dissatisfaction with ABT Opti-flow Burners

Sep 26, 2005
ABT letter to IPSC - response to letter of Sept 6, 2005.

October 15, 2005
F row elbows pulled - erosion issues on burner tips and coal pipes observed

October 18, 2005
F row inspection pictures and report sent to ABT email Dean Wood to Sal Ferrara

Nov 1, 2005
Conference call with ABT and IPSC personnel over burner issues

Nov 1, 2005
IPSC letter to ABT, Invitation to Visit IGS to Inspect Failing Burners

Letters SENT to ABT

IP7020665

9/6/05 jmj

INTERMOUNTAIN POWER SERVICE CORPORATION

September 6, 2005

Mr. Joel Vatsky
Advanced Burner Technologies
P.O. Box 410
271 Route 202/206
Pluckemin, NJ 07978

Dear Mr. Vatsky:

Dissatisfaction with ABT Opti-Flow Burners in IGS Unit 2

This letter is to express the dissatisfaction of Intermountain Power Service Corporation with the performance of ABT's Opti-flow burners that were installed on Intermountain's Unit 2 in the spring of 2004. We are holding ABT at least partially culpable in the recent failure of the Unit 2 F3 burner module and request ABT's assistance in resolving our concerns.

The thermowell design supplied on your burner modules precludes the use of heavy-duty thermocouples (TC's). The bend radius is too tight to allow insertion of the 1/4 inch TC's we specified. The 1/16 inch TC's supplied with the burners are failing prematurely. We are convinced that lack of instrumentation, which would have warned us of a burner fire, contributed to the failure on F3.

We are also experiencing premature wear-related failure of some of our x-vane fuel distributors and elbows at the burner inlet. These failures are unacceptable, especially in burners that are only a little over a year old.

We have suspended plans to replace burners on Unit 1 until we can get these issues resolved. We are requesting assistance from ABT in investigating the cause of these failures and in making them right.

Please contact Mr. Dean Wood at (435) 864-6464 with questions regarding these claims or to set up a plant visit to resolve these issues.

Sincerely,

George W. Cross

George W. Cross
President and Chief Operations Officer

GWC:DEW/JKH:jmj

850 West Brush Wellman Road, Delta, Utah 84624 / Telephone: (435) 864-4414 / FAX: (435) 864-6670 / Fed. I.D. #87-0388573

IP7020666

11/2/05 CO
faxed 11/1/05 CO

INTERMOUNTAIN POWER SERVICE CORPORATION

November 1, 2005

Mr. Joel Vatsky
Advanced Burner Technologies
P.O. Box 410
271 Route 202/206
Pluckemin, NJ 07978

Dear Mr. Vatsky:

Invitation to Visit IGS to Inspect Failing Burners

Intermountain Generating Station Unit 2 will be off line this coming Saturday, November 5, 2005. We invite you or your representatives to visit the site to inspect some of the ABT burners in this unit. Mr. Sal Ferrara asked us to inform ABT when an opportunity like this arose. This is the second outage of this type in the past 30 days.

Several IPSC employees in the Engineering department have been in contact with Mr. Ferrara via telephone and e-mail to communicate premature erosion issues we are experiencing with the ABT burners that were installed on IGS Unit 2 in the spring of 2004. We have shared verbal descriptions, written inspection reports, and photographs of these issues with ABT in a good faith effort to get help resolving them. We feel strongly that it is important that your design Engineers visit the site and see for themselves the damage we see in these burners after just 18 months of operation.

We have expressed a desire to work with ABT to come up with a retrofit to these burners, and the fact that we are on a very tight schedule if the retrofit modifications are to be installed during our upcoming major outage on IGS Unit 2 in April of 2006. We need to act now if we are to have any chance of taking advantage of that outage window.

Please let us know in the next day or two if you plan to send someone. We will have knowledgeable personnel on call to host your visit when you arrive.

Please contact Mr. Dean Wood at (435) 864-6464 with questions regarding this request.

Sincerely,

George W. Cross

George W. Cross
President and Chief Operations Officer

DEW/JKH:jmj

INTERMOUNTAIN POWER SERVICE CORPORATION

April 24, 2006

Mr. Joel Vatsky
Advanced Burner Technologies
P.O. Box 410
271 Route 202/206
Pluckemin, NJ 07978

Dear Mr. Vatsky:

Request for Repair of Intermountain Generating Station Unit 2 Burners

In March 2004, we installed 48 of your Opti-Flow Low NO_X Burners in Unit 2 at the Intermountain Generating Station under Contract 45606. Since that time, we have experienced numerous problems with the burners. Among the most important identified to date are the following:

1. Erosion of the burner barrel just downstream of the long-sweep elbow. This has occurred on every burner and we believe it is caused by the diffuser assembly you designed and supplied that is located in the elbow.

2. Erosion of the burner nozzles where it divides into the six segments just prior to discharge. Every burner showed significant erosion with many having multiple holes.

3. Severe cracking and structural failure of the burner nozzle which originates from the weld of the nozzle to the burner barrel. The cracking of the nozzles was so severe on 15 of the 48 burners on a recent inspection that those 15 nozzles had to be removed and replaced.

4. Erosion of the ceramic lined long-sweep elbow and X-vane diffuser.

5. One burner (F3), was completely replaced because it was damaged in a burner fire on June 25, 2005. After inspecting the damaged burner, we believe the fire was caused by a hole eroded in the burner barrel just after the elbow. We believe the hole allowed coal to enter the inner air sleeve and eventually catch on fire damaging the burner.

The contract you signed with us on September 12, 2003 contained several clauses pertaining to the failures that we have experienced. For example, Division F2, Article 5, Paragraph "g" states:

> *"Experience based and verified wear-life shall be quoted within the bid for all burner components. No component shall last less than four (4) years before requiring rebuild, restoration, or replacement."*

850 West Brush Wellman Road, Delta, Utah 84624 / Telephone: (435) 864-4414 / FAX: (435) 864-6670 / Fed. I.D. #87-0388573

Also, Division F2, Article 5, Paragraph "f" states:

> *"The burner assemblies shall be fabricated of quality material sufficient to withstand the significant thermal stresses occurring within the windbox as a result of both radiant and convective heating. Any deformation causing malfunction of register assemblies or misdirection of flow through the burner within the period of guaranteed operability shall be repaired at the earliest possible opportunity and charged to Contractor."*

Due to the need for continued operation of IGS Unit 2, we have purchased the materials necessary to temporarily repair the burners. However; we are now requesting the following remedial actions from ABT according to the terms of the contract:

1. With no additional IPSC reimbursement, ABT should make the necessary modifications to their design to solve all of the problems we have experienced with the burners as outlined in this letter and to otherwise meet all of the specifications of the contract.

2. With no additional IPSC reimbursement, ABT should supply the necessary materials and manpower to install those design changes on all 48 of the IGS Unit 2 burners. This work should be done on the next Unit 2 major outage scheduled for the spring of 2008.

3. ABT should reimburse IPSC for the burner purchased to replace the fire-damaged F3 burner. We believe the fire was the direct result of an ABT design flaw that allowed rapid erosion of the burner barrel.

4. ABT should reimburse IPSC for the materials purchased from ABT to repair the burners during our April 2006 Unit 2 outage.

If you have any questions concerning this matter, please contact Jerry Hintze at (435) 864-6460.

Sincerely,

George W Cross

George W. Cross
President and Chief Operations Officer

JKH:jmj

cc: Garry Christensen
Phil Hailes
Will Lovell
Mike Alley
Robert Rees
Nancy Bennett

IP7020669

INTERMOUNTAIN POWER SERVICE CORPORATION

July 31, 2006

Joel Vatsky, CEO
Advanced Burner Technologies
271 Route 202/206
P.O. Box 410
Pluckemin, NJ 07978

Intermountain Generating Station Unit 2 Low NO_X Burners
Contract 04-45606; Response to ABT Letter dated May 9, 2006

Dear Mr. Vatsky:

We regret that the burners supplied by ABT fall short of the claims, guarantees, and warranties provided for in Contract 04-45606. The burner deficiencies have caused IPSC to incur considerable cost and inconvenience. We reiterate that we are holding ABT responsible for those costs allowed for in the subject contract. We request a favorable response to these claims by August 18, 2006. If we are not satisfied with your response, we will refer this claim to our attorneys.

While your May 9, 2006 letter very eloquently denied our claims, your responses did not address contractual guarantees made by ABT. In fact, there is clear evidence that ABT did not adequately design the burners as required by the contract specifications. It is not our intent to engage in a tit-for-tat debate over opinions and differences in viewpoint. Rather, we would like to refocus this issue on the contractual guarantees and the expectations we had of your burners that failed us. We illustrate just a few examples in the following paragraphs.

1. **Burner Design**
   You claimed in the subject letter that IPSC had not been forthcoming with you when you claimed, "*In this case two critical items were not provided to ABT: the expected fuel change that resulted in significant increases in fuel and primary air flow, and the overheating of the original equipment burner barrels.*" Under item 1 of said letter "*IPSC has operated for an extended period of time (September 2004 through April 2005) on coals having significantly lower HHV properties than allowed by ABT's design.*" Let us address each of these items separately:

   Design Fuel
   IPSC has not changed its fuel. As stated in ABT's proposal under Executive Summary and Philosophy "*The specification* (Referring to Specifications 45606; Attachment 3; General Coal Properties) *lists several western bituminous coals, none of which, either singly or in the combinations specified, present any problem to ABT.*" This list has coals with High Heating Values (HHV) ranging from 11,292 Btu/lb to 13,069 Btu/lb. Intermountain's average HHV over the two years of operation (April 2004 to April 2006) was 11,481 Btu/lb. We recognize a four-month period during these two years when we received poor quality coal, but we compensated operationally by either running eight mills or reducing load such that the burners did not exceed the contract maximum-rated BTU throughput of 220 Mbtu/hr.

Burner Design Basis (Fuel and Primary Air Flows)
In Section 4.9 of the Contract (ABT's proposal) you state that *"ABT will design the burners for full load primary air flow, per mill, as per the OEM mill curves, with one mill out of service at boiler full load."* This should have been the design basis of your burners. Mr. Sal Ferrara confirmed that this was the basis you intended to use when he responded by e-mail to this specific question on 10/28/05, stating; *"the fuel injector was designed based on the OEM Mill "Present Curve" (see e-mail attachment) for full load, with one mill out of service. Based on the curve, the burner design point is 62 MCFM PA flow @ 102 Mlb/hr coal flow."*

Whereas your intent to use the OEM curves was clear, it appears you made an error in establishing your basis. The point stated by Mr. Ferrara comes from the OEM curves but at a steam flow of 6,400 Mlb/hr (6,400,000 lb/hr) steam flow which is not the steam flow of the contract. As stated in the contract and in ABT's proposal introduction, the rated steam flow is 6,900 Mlb/hr (6,900,000 lb/hr).

Using the same OEM curve but extending it to 6,900 Mlb/hr with seven mills in-service, the primary air (PA) flow from the curve reads 63.5 MCFM at 110 Mlb/hr coal flow. This correlates to 248,031 lb/hr PA flow. Section 4.1 of your proposal allows for ± 5 percent tolerance in the PA flow. Therefore, the design should allow for PA flows up to 260,433 lb/hr with no damage to the burners or elbows.

You claim to have used a design point of 210,000lb/hr as the design flow for your fuel injector sizing and further claim that this point was confirmed by Mr. Phil Hailes of IPSC. Mr. Hailes' e-mail response to your question was specifically, *"3,500 lbs/min is the average rate that Unit 1 at 950 MW is running at today with seven mills. What specified condition are you requesting?".* If you used this statement to determine your design point you did so in error. The number Mr. Hailes provided was a snapshot average of **Unit 1** and has no bearing on Unit 2. Your design point should have been based on the OEM curves as stated above.

2. **Overheating**
Again, in the subject letter, you accuse IPSC of not providing ABT with information concerning the overheating of the original equipment burner barrels. In item 3 it states, *"Note that this was the first time ABT was advised of this overheating condition with the OEM burners and had this been conveyed to ABT during the bidding or design phase of the project, we would have extended the stainless steel portion of the barrel."*

Materials Selection
How can you make this assertion? It is ABT's responsibility to design for the environment that the burners will operate in. In ABT's contractual proposal, Section 6.4, Part C - Division C3 it states *"There are no environmental limitations to the coal burners."* Under the Explanatory Comment you further state, *"The reason for stating that there are no environmental limitations to the coal burners is that the stainless steel castings and plate facing the fire, ASTM 297 Gr He or 309 will not deteriorate at temperatures of at least 2,000 °F. Consequently, ABT does not consider operation of its design in your boiler to have any environmental limitations. The conditions are such that no material will operate anywhere near its limit. In fact, ABT has placed no such limitation on any retrofit ABT has done."*

You must have been aware of IPSC's concern about high temperatures at the burner front since we paid an extra $40,800 for a material upgrade to 253MA on burner components due to heat concerns. We specified and paid for two (2) thermocouples to be installed on each burner for temperature monitoring even when you assured us none were needed.

The OEM burners in our Unit 1 were upgraded from a 25-inch long, 309 SS tip to a 33-inch long, higher grade cast tip to prevent thermal degradation of the nozzle tips. This was done only after six years of operation. For your nozzle tips to fail within two years of startup is unacceptable especially given your contractual warrantee of 48 months for workmanship and quality of the coal nozzle tips (refer to Section 4.1 of ABT's proposal).

3. **Coal-Nozzle Tip**

In the subject letter, you state that, "We advised in the meeting that the temporary repairs that IPSC wanted to implement would not resolve the barrel overheating and nozzle cracking problem. ABT explained that it would be necessary to extend the carbon/stainless steel weld point further from the furnace by replacing a section of the carbon steel barrel with a stainless steel barrel."

Stainless-to-Carbon Steel Weld Location

A comparison of the distance from the centerline of the wall tubes to the tip-to-carbon steel transition between the ABT design and the upgraded OEM nozzles is within 1 inch. You imply in your April 10, 2006 letter that you are just beginning to understand that burner fronts with large throats can cause overheating in the barrel. Please keep in mind that both our units have been running with the same coal and similar loads over the past two years. Unit 1 burners have not experienced the thermal damage witnessed in the ABT burners on Unit 2. In fact, Unit 1 has been running for 14 years with similar distance from water wall tubes to the weld transition line without failure. Something in your design is not right.

Out-of-Service Cooling Air

Your subject letter (on page 3) implies that lack of cooling air flow on out of service burners could have lead to the damage witnessed in the coal-nozzle tips. If we did operate with no cooling air, you could hardly blame us since ABT did not provide us with operating guidelines for out of service flow. Out of service air flow is a system loss and was therefore one of the considerations for buying ABT burners since you claimed that cooling air was not needed. In reality, we have always used cooling air flow and the burners still failed.

Per your proposal, Section 3.6 ABT Field Services; ABT dispatched an engineer for field installation and testing support to assist during the initial stages of installation, startup, check-outs and during optimization of the new combustion equipment. At no time during this commissioning work was cooling-air flow an issue. The ABT personnel on the job stated that out-of-service cooling air was not required with the ABT design. This was consistent with ABT's claim in their proposal of no environmental limitations. On this advice IPSC left the out of service cooling air damper positions at the previous set points in the controls. Only in the April 10, 2006 ABT letter was cooling air on out of service burners a concern. Knowingly or unknowingly, ABT has misled IPSC on the ability of their burner to withstand the environment of operation.

4. **Erosion**

In Section 2.2 of your contractual proposal it states that; "*The segmented coal nozzle has an open design with no obstructions to wear or to collect coal,*" and in 7.2; "*In the ABT design, all wear is limited to the wear-resistant devices in the elbow. The Opti-flow system eliminates coal ropes and produces a nearly uniform fuel/air mix with axial flow downstream of the elbow. Therefore, the only erosion-prone areas will be located within the elbow.*"

Clearly, we are experiencing erosion issues that neither IPSC nor ABT anticipated. We have addressed the question of excessive coal velocities in number 1 above. The fact that we have experienced erosion-related failures in our coal barrels, nozzle tips and sweep elbows in less than two years of operation is unacceptable especially in light of the assurances you gave us as referenced in the paragraph above and the warrantee of 48 months on the nozzle tips.

The erosion issue gets back to design. You assert that the only wear parts will be in the x-vane diffuser yet our burners are wearing through the sweep elbows, the coal barrel and at the coal-nozzle tip. Our notes from our meeting with you and Mr. Ferrara indicate that you admit that you did not conduct a CFD model of the sweep-elbow/x-vane diffuser combination. We maintain, based on experience, that there is a flaw in this design.

IPSC would like to remind ABT that the responsibility to provide a burner design that will function properly in the operating environment of our furnaces lies with ABT not IPSC. Again, we request a favorable response to these claims by August 18, 2006.

Sincerely,

George W. Cross

George W. Cross
President and Chief Operating Officer
Intermountain Power Service Corporation

GWC:JKH:jmj

Attachments

Letters RECEIVED from ABT

IP7020674

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April 10, 2006

Mr. Garry Christensen, PE
Performance Engineer
Intermountain Power Service Corporation
850 West Brush Wellman Road
Delta, Utah 84624-9546

Re: Intermountain Delta #1
Burners

Dear Garry:

Advanced Burner Technologies Corp has evaluated the photographs and information provided depicting the damage to the burners on Delta #1. It appears that all the damage is cracking on the upstream side of the coal nozzles, next to the carbon steel fuel barrel.

Last fall we were notified that the furnace end of the fuel barrel, upstream of the stainless steel nozzle, was being overheated and that this problem had occurred with the OEM burners that were replaced. IPSC had modified the OEM fuel barrels by adding a stainless steel section upstream of the nozzle. However, this information had never been provided to ABT, as discussed at our meeting last fall when Joel Vatsky and Sal Ferrara visited the station.

We believe the cause of the nozzle cracking is the overheating of the fuel barrel that causes excessive stress on the weld between the carbon steel barrel and tip casting. ABT has converted both B&W and Foster Wheeler boilers to this type of burner and we have never had a single nozzle failure; nor failure of any throat casting.

We have recently tested the burners on a 530MW, 24 burner, Foster Wheeler unit, that has been in service with essentially the same burner as at Delta #1. This unit has burner throats only slightly smaller than those at Delta #1: 49" vs 51" respectively. Since the FW burners had originally been equipped with thermocouples, we retained them on the ABT burners. A test has been run where we gradually closed the register sleeve dampers to fully closed while the burner barrel and tip temperatures were measured.

The result was that the tip temperatures remained well within the temperature limitation for the casting. However, the carbon steel barrel temperatures rose to over 900°F and would have caused the same damage seen at Delta if the sleeve damper was not opened slightly. This unit has been in service nearly two years and was recently inspected during an outage. The burner barrels and nozzles, as well as the throat rings, were in "like-new" condition.

The difference in control philosophy between FW and B&W means that on the former unit the sleeve dampers are remotely operated to control flow into the individual burners, whereas the latter unit's sleeve dampers are manually controlled, with flow controlled by the compartmented windbox control dampers.

If those windbox dampers are not sufficiently opened, furnace gases will come too close to the burner parts and cause the type of damage seen on the Delta #1 burners.

ABT believes that insufficient secondary air flow when the burners are out of service is the cause of this damage. The fact that IPSC resolved the barrel overheating problem by replacing a section of carbon steel barrel with stainless steel, in the section that ABT measured with high temperatures when the air flow is insufficient, confirms our analysis.

We have already requested information from IPSC to evaluate the windbox dampers' controls and actuators to see if the dampers remain sufficiently open when the burners are out of service. After this information is received, we would like to discuss this matter further with you.

Very truly yours,

Tom Shults

Tom Shults, PE
Project Manager
Advanced Burner Technologies

C: Dean Wood, Joel Vatsky, Tarkel Larson, Sal Ferrara

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Mr. Garry Christensen, PE
Performance Engineer
Intermountain Power Service Corporation
850 W. Brush Wellman Road
Delta, UT 84624-9546

April 19, 2006

Re: Recommended Test Program
regarding Burner Overheating

Dear Garry,

We are sincerely concerned about the recently discovered, extensively heat damaged nozzles on the ABT burners at your plant. Be assured that we want to work with you to get to the root cause of this problem.

As we discussed with you, we have not experienced damage like that seen in your plant elsewhere. Therefore, we would like to investigate if the problem is systemic. Our hypothesis is that the burners are overheating during the periods they are out of service. Specifically, we believe that the windbox dampers are not allowing sufficient cooling air flow. So, we recommend that you attach some thermocouples to the tips of all the burners in a row and record the temperature:

- from startup to full load,
- when this row is then forced out of service, and
- as the windbox dampers are gradually opened while the row is out of service.

Rows D or H would seem to be good candidates for this test. We recommend that this data may be taken with temporary thermocouples attached about 34 inches upstream of the end of the nozzle. This will be easier to accomplish on those fuel injectors that have been disassembled. On the others, you may be able to cut a hole in the inner spin vane area and place a weld pad with the thermocouple attached.

In addition, it would be useful to measure the temperatures above on row C for comparison purposes, since row C did not appear to have damage as extensive as some other rows, such as D, H or G. We noted that the rear wall burners seemed to have somewhat worse damage than those on the front wall, also. Are there any differences in operation, instrumentation, or otherwise, that would explain this?

Please keep us in the loop on all of your burner issues. We have a great deal of experience and we want to bring all of our knowledge to bear on the problems until they are resolved.

Very truly yours,

Tom Shults

Tom Shults
Project Manager
Advanced Burner Technologies

C: Joel Vatsky, Sal Ferrara, Tarkel Larson

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GWC
MAY 1 5 2006

May 9, 2006

Mr. George W. Cross, President and Chief Operating Officer
Intermountain Power Service Corporation
850 West Brush Wellman Road
Delta, Utah 84624

Subject: Intermountain Generation Station Unit 2 Low NO_x Burners, Contract 04-45606
IPSC April 24, 2006 Letter

Dear Mr. Cross:

Advanced Burner Technologies Corporation (ABT) is concerned that damage has occurred to the burners we have supplied. Although we deny IPSC claims that ABT has any responsibility, we do however remain committed to help IPSC. To this end we have been working closely with the Plant to identify the root causes that first became evident on June 27, 2005 with IPSC's Mr. J. Finlinson's email notification of the F3 burner fire.

We can understand that changes in operation (such as fuel supply) and occasionally information that can be important to the supplier may, through inadvertent oversight, not be provided to the supplier. In this case two critical items were not provided to ABT: the expected fuel change that resulted in significant increases in fuel and primary air flow, and the overheating of the original equipment burner barrels. There is no way any equipment designer can design for conditions of which they are not made aware by the owner.

The following Items 1 through 5 of the subject Intermountain Power Service Corporation (IPSC) letter that describes problems identified by IPSC are as follows, with ABT responses added in **bold** text:

1. Erosion of the barrel just downstream of the long-sweep elbow. This has occurred on every burner and we believe it is caused by the diffuser assembly you designed and supplied that is located in the elbow.

   ABT response:
   The diffuser assembly, otherwise known as "x-vane", located in the elbow is a wear component, however it has worn more rapidly than the standard design we have in operation at all our other installations. ABT's proposal included supply of the standard x-vane design which eliminate the cleanout plug at the elbow's centerline; however, in early stages of the project IPSC requested a change in order to retain the existing port in the burner inlet elbow. ABT agreed to make the change but also advised IPSC that the standard x-vane as originally offered was a better, simpler, design. In any case, the accelerated wear to the x-vane assembly, and erosion of the barrel downstream of the long sweep elbow, is due to IPSC operation of their coal mills at higher flows than allowed by contract and the burner design. As stated in Proposal

IP7020679

Section 4.9, ...ABT will design the burners for the full load primary airflow, per mill, as per the OEM mill curves, with one mill out of service at boiler full load. The design mill primary airflow (210,000 lb/hr) for fuel injector sizing was also confirmed early in the project with J. Vatsky 9/11/03 email correspondence to P. Hailes.

It did not become evident that IPSC is running the mills at much higher flows than design until October 2005. IPSC's G. Christensen 10/27/05 email correspondence advised flows are as high as 265,000 lb/hr, which is more than 25% greater than the burner design flow agreed between IPSC and ABT. ABT's S. Ferrara responded immediately with 10/28/06 email advising effects of higher operating flows by degrading performance and increasing component wear.

Based on IPSC long term records of fuels burned (Mr. G. Christensen 11/2/05 email correspondence) IPSC has operated for an extended period of time (September 2004 through April 2005) on coals having significantly lower HHV properties than allowed by ABT's design. The lower than specified HHV (≤11,500 Btu/lb) results in overfiring of burners (higher than design air and coal flows) in order to maintain full load generation on the Unit.

2. Erosion of burner nozzles where it divides into the six segments just prior to discharge. Every burner showed significant erosion with many having multiple holes.

ABT response:
Erosion of the burner nozzles is due to high velocities of the air/coal mixture in the nozzle, along with the higher coal loadings resulting from the lower heating value coal. This condition may be worse due to by denser coal streams being formed in the non-standard design of the x-vane assembly.

Had ABT known that IPSC intended to operate the mills at the current coal and air flows, the burner nozzles would have been designed accordingly resulting in lower nozzle velocities. ABT has not experienced nozzle erosion at any of its other installations where the mills are operating in the range for which the burner is designed.

In cases where it is known that erosive conditions exist (high velocity and/or highly abrasive fuel) ABT will apply erosion resistant materials in the fuel injector barrels as well as the inlet to the nozzles to maximize their longevity. This was not the case with IPSC as the coal was not considered to be highly abrasive and the contract defined flows result in relatively low air/coal velocity in the nozzle.

Had ABT been advised that such a fuel change and resultant mill operation was anticipated, we would have proposed the changes noted above.

3. Severe cracking and structural failure of the burner nozzle which originates from the weld of the nozzle to the burner barrel. The cracking of the nozzles was so severe on 15 of the 48 burners on a recent inspection that those 15 nozzles had to be removed and replaced.

ABT response:
This is consistent with discussions held in the November 9, 2005 meeting at the Intermountain Generating Station where ABT explained that the carbon steel burner barrels were overheating upstream of the point where carbon steel barrel is welded to the stainless steel nozzle tip. The carbon steel is expanding at a higher rate than the

stainless casting causing the casting to rip at the weld and cracks to then form in the casting.

We advised in the meeting that the temporary repairs that IPSC wanted to implement would not resolve the barrel overheating and nozzle cracking problem. ABT explained that it would be necessary to extend the carbon/stainless steel weld point further from the furnace by replacing a section of the carbon steel barrel with a stainless steel barrel. IPSC advised in the meeting that the OEM burners originally provided on the Unit had experienced the same overheating problems witnessed on the ABT nozzles and the resolution was to extend the stainless steel portion of the barrel just as ABT is recommending. IPSC advised in the meeting that based on conditions observed during the recent October 2005 outage, it would not be necessary to implement ABT's recommendation to extend the carbon/stainless steel weld point back during the April 2006 outage.

Note that this was the first time ABT was advised of this overheating condition with the OEM burners and, had this been conveyed to ABT during the bidding or design phase of the project, we would have extended the stainless steel portion of the barrel.

We have not experienced this type overheating problem on any of the ABT burner designs currently operating in the industry, which all have the carbon/stainless steel weld point in similar proximity to the furnace as is currently operating on the ABT burners at IPSC. The only time we have seen elevated temperatures on the carbon steel barrel is when the cooling secondary airflow to the burners was completely shutoff and we suspect that this may be happening at IPSC. We have suggested an investigative program to the Plant in order to determine if any operating conditions exist where insufficient cooling flow is available to the burners. In particular we believe that the compartmented windbox air control dampers may be too closed when the burner deck is out of service and have asked the Plant to investigate this. To date we have not had any response or been provided with any information.

4. <u>Erosion of the ceramic lined long-sweep elbow and x-vane diffuser.</u>

<u>ABT response:</u>
The ceramic lined long sweep elbows are original boiler equipment and were not replaced by ABT during the Low NOx Burner retrofit. The erosion of the x-vane diffuser is discussed in item 1 above and is a result of IPSC operating the coal mills at primary air and coal flows much higher than allowed by the contract.

The x-vanes are replaceable components and are expected to wear over a period of years. ABT has an on-going development project to identify the latest wear-resistant materials so that we can select those materials that best fit the specific fuel properties and flow conditions for each project. At the design fuel and flow conditions specified by the IPSC project, the x-vane assemblies supplied by ABT would last many years prior to needing replacement. The fuel and flow conditions that IPSC has been recently operating at, and has defined for the future, would require a change to material selection of ABT's x-vanes, at an increased cost, in order to minimize the type wear IPSC is experiencing of this component. Further the burner barrels would have to be lined and the nozzles replaced with new ones designed for the actual flows now being utilized.

5. <u>One burner (F3) was completely replaced because it was damaged in a burner fire on June 25, 2005. After inspecting the damaged burner, we believe the fire was caused by a hole eroded in the burner barrel just after the elbow. We believe the hole allowed coal to enter the inner air sleeve and eventually catch on fire damaging the burner.</u>

   <u>ABT response:</u>
   Due to the extent of fire damage on F3 burner, it was not possible to determine the cause although based on the photos provided by IPSC it seems to have started either in the coal pipe or at the burner inlet. We noted that the coal pipe upstream of the burner, where the pipe passes through the floor grating, in the area of the coal pipe shutoff valve also showed evidence of fire, leading us to question whether the valve was only partly open.

   As noted in J. Finlinson's 6/27/05 email, the IPSC operators were starting up the other Unit on June 25, 2005 at the time the fire started on F3 burner and therefore did not notice the high temperature alarms(well over 1600°F). It is not known how long the fire went unnoticed by the operators, however operator action to take the burner out of service would have prevented permanent damage to the burner components. F3 burner is the only one of 48 burners on the unit that suffered permanent damage from fire in over 2 years of operation. This being the case, it can only be concluded that the F3 incident is due to some type of operational malfunction rather than due to design defect in the burner.

The subject April 24, 2006 letter notes that IPSC "purchased the materials necessary to temporarily repair the burners." IPSC's letter also states "we are now requesting the following remedial actions from ABT according to the contract:"

1. <u>With no additional IPSC reimbursement, ABT should make the necessary modifications to their design to solve all the problems we have experienced with the burners as outlined in this letter and to otherwise meet all the specifications of the contract.</u>

   <u>ABT response:</u>
   The ABT burners are designed to the conditions of the contract and the problems experienced are due solely to IPSC operating conditions being outside those specified. This type of operation has voided the ABT "Guarantees and Warranties" as stated in Proposal Q03013, Section 4.9 (Contract Article III: Part C). ABT has already made the necessary design modifications to meet the new operating conditions provided by IPSC and has provided the Plant with a proposal in November 2005.

2. <u>With no additional IPSC reimbursement, ABT should supply the necessary materials and manpower to install those design changes on all 48 of the IGS Unit 2 burners. This work should be done on the next Unit 2 major outage scheduled for the Spring of 2008.</u>

   <u>ABT response:</u>
   ABT has already proposed to supply replacement fuel injectors for all 48 of the IGS Unit 2 burners and, as noted above, has designed these to the new conditions provided by IPSC. IPSC shall install the ABT supplied materials at IPSC cost. ABT's offer made during the November 9, 2005 meeting remains to supply the new fuel injectors to IPSC at a discount. We offer the discount as a good will gesture to work with IPSC and resolve the unexpected problems amicably.

IP7020682

As a further good will gesture, ABT will maintain the November 2005 price if we receive the Purchase Order and initial payment by June 15, 2006 for delivery by December 2006.

3. ABT should reimburse IPSC for the burner purchased to replace the fire damaged F3 burner. We believe the fire was the direct result of an ABT design flaw that allowed rapid erosion of the burner barrel.

ABT response:
Damage to the F3 burner is due solely to operator inaction to control room alarms, allowing a burner fire to progress for long period rather than removing the burner from service to prevent permanent damage. The ABT design is not flawed and the rapid erosion problem is due to IPSC operating the burners at flow conditions outside the contract specifications.

4. ABT should reimburse IPSC for the materials purchased from ABT to repair the burners during the April 2006 Unit 2 outage.

ABT response:
During the November 9, 2005 meeting, ABT advised that the fuel injectors would require redesign to support operation at the higher flow rates. ABT also presented the new design arrangement during the meeting, and proposed to supply forty-eight fuel injectors for installation during the April 2006 outage. IPSC advised at that time that they were only interested in implementing temporary repairs during the April 2006 outage and intended to purchase the replacements designed for the new conditions for the next major outage. The cost for materials to make the temporary repairs will not be reimbursed by ABT to IPSC.

To summarize: the damage that has occurred is a direct result of changes in Plant operation (fuel and mill conditions) and failure of IPSC to inform ABT of the original burner barrel overheating problem that could have been addressed in the initial design phase.

AT remains committed to support IPSC in resolving these issues and hadprovided a proposal to do so as soon as we were advised of the actual operating conditions.

Please contact Sal Ferrara at 908-470-0721 to discuss any question you have on this matter.

Sincerely yours,

Joel Vatsky
President and CEO

Cc: Sal Ferrara

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August 16, 2006

Mr. George W. Cross
President and Chief Operations Officer
Intermountain Power Service Corporation
850 West Brush Wellman Road
Delta, Utah 84624

Subject: Intermountain Generating Station Unit 2 Low NO_x Burners

Ref: Response to IPSC Letter Dated July 31, 2006

Dear Mr. Cross:

Having reviewed the referenced letter it is clear that there are significant misunderstandings regarding our positions, design conditions, evaluations of the problems being reported and our actual experience. It is regrettable that you choose to claim that ABT has fallen "short of the claims, guarantees and warrantees" provided for in the contract. In truth, all of our claims have been and are correct and we have met or exceeded all performance guarantees expressed in the contract; in addition to our predictions. It now appears that, regardless of our previously supplied objective comments, which we do not consider differences of opinions or viewpoints, you have chosen to make a warrantee claim for damage that you have been led to believe is ABT's fault.

Regarding our claims: If IPSC personnel have not already done so, we suggest that they contact all of the references we have provided as part of the proposal phase. You will find that all of the claims we made were true at that time and since.

Regarding performance guarantees: You may be aware that our service manager, Tarkel Larson, was at the site to start up the boiler. Although we were ready at that time to commence optimization, the station was not. The reason we were given was that the test grid was not ready and we should leave and would be called back "soon". After nearly six weeks we called to enquire when we could return to perform the testing. At that time we were told that the station was attempting to tune our burners using new flame scanners and burner air flow measurements and those attempts were not successful. In fact we were told there must be something wrong with our burners since attempting to move the flame so as to see changes in the new scanners was proving unsuccessful. Had we been advised that this was the plant's intent, we would have advised against it. For the simple fact that we have gone to considerable extent to develop a low NO_x burner that produces a very stable flame, low NO_x, low CO and UBC and very good turndown. Once the grid was installed we demonstrated all guarantees in a matter of days. All retentions were then paid.

While it is not my intention to respond here to all the comments in your multi-page letter, I do have a few brief comments to make:

Overheating: The only concern that IPSC personnel ever expressed to ABT was overheating of the original B&W registers. IPSC insisted on substituting a high alloy steel, 253 MA, for the other carbon and stainless steels we normally use; despite our assurances that we have never experienced, with our registers, the high temperatures in the register locations that were of concern and that we saw no need to substitute exotic materials for our normal ones. Nevertheless, the plant chose to proceed with the 253 MA.

Subsequent to the startup at no time did the register temperatures exceed the normal values we have seen, thereby confirming our predictions.

However, as I noted in previous correspondence, at no time was ABT ever informed that high burner barrel temperatures had been experienced with the OEM burners and that the solution was adding an extension made of stainless steel; this is a completely different problem than the register temperature. Clearly ABT should have been advised of this history so that we could make our own design decisions as to how to deal with that problem (which we have never seen on any other B&W burners we have replaced; thereby indicating that there is something amiss at Delta). As you have noted it is not IPSC's responsibility to design our equipment; but as I have noted it is incumbent upon IPSC to provide us with any and all relevant information so that we can design to the proper conditions. Clearly, ABT was not provided all the relevant information.

Large Burner Throats: It seems clear that you have completely misunderstood my comments. No, we are not "just beginning to understand that burner fronts with large throats can cause overheating in the barrel." Quite the contrary: on installations of ours with large burner throats, none have ever experienced overheating problems on any part of the burner. We have installations on very hot pre-NSPS boilers with 52" throats that have been in service since the late 1990's with no such indications, let alone failures.

In fact there is a site that has our first installation in Vernal, Utah, Deseret's Bonanza #1, which has burners installed in 1997, has 54" throats and has had no problems of reliability. This unit typically operates at NO_x levels in the 0.35-0.4 range and is not equipped with overfire air. You should also note that when Deseret became aware that their operating conditions could change they asked us to do an evaluation of the new conditions and render an opinion (which we did at not cost to them) rather than make assumptions as to how our equipment would react under the new conditions. As a consequence, that plant has had no problems even though they have made major modifications to their operation.

To repeat: there is *no* ABT installation that suffers the problems that occur at Delta #2. Logic as well as common sense would dictate that the problem is not in the burner design but in the site-specific conditions that ABT was never notified about. The responsibility to provide the burner design conditions, and maintain them during operations, remains with the owner; in this case IPSC.

All of the above not withstanding, we have been very clear all along that we are willing to work with IPSC to address the situation as it now stands. I suggest that the only way this can be accomplished is by a direct meeting between you and me with no more than one or two of our respective staff members who are most familiar with this retrofit project.

If you are in agreement, please call me to finalize a meeting date (908-470-0720).

Sincerely,

Joel Vatsky, President

Cc: Sal Ferrara

JV-GC8-16-06.DOC

IP7020685

ADVANCED BURNER TECHNOLOGIES

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February 12, 2007

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JOYCE

Mr. George W. Cross
President & CEO
Intermountain Power Service Corp.
850 W. Brush Wellman Road
Delta, Utah 84624-9522

Subject: IPSC Demand Letter and Offer of Settlement; Dated February 2, 2007

Dear Mr. Cross:

I returned from a two week overseas trip late last week and did not see the subject letter until today. Consequently, there is no way we can respond within 14 days of February 2. We will respond to the entire letter in 14 working days from today.

However, we have a few comments regarding some of the statements made in the letter:

1: **Primary Air Flow**: Regardless of the method used to translate between volumetric flow and mass flow, ABT correctly used the B&W curve to size the fuel injectors. That curve, as you note, is a volumetric curve at the operating temperature of 150° F. We explained that fact to you at our meeting on November 9, 2006. Per contract we used the B&W curve; the design is correct.

The calculation that IPSC presents is correct in that the density of air is 0.065—AT SEA LEVEL! At the altitude of the Delta plant the density of air is 0.055.

Therefore: $(66{,}500\text{ft}^3/\text{min})(60\text{min/hr})(0.055\text{lb/ft}^3) = 219{,}500$ lb/hr.

The design value used by ABT (based upon the information supplied by Mr. Hailes) was 210,000; with the 5% margin allowing 220,500. However, if IPSC had responded to our September 30, 2003 letter with the steam flow that corresponded to the 950 MW mill data we would have been exactly on the 219,500 point.

Again we must reiterate: if the mills are in fact set to operate at up to 260,000 lb/hr then the flows through the burners are up to 24% higher than design. You really should have the mills' primary air flow calibrated by an outside contractor.

2: **Pre-Installation Testing**: Quite frankly we are incredulous that IPSC is taking the position expressed in this section. IPSC most definitely did agree to perform such pre-retrofit, as well as the post-retrofit, testing precisely as quoted. The work scope of our proposal is one of the Contract documents and is the specific part of the entire Contract that lists, and defines, the work scope as well as the responsibilities of the respective parties. You and I both signed it and to claim IPSC had no responsibility to meet the commitment clearly made in the Contract is fallacious.

IP7020686

Our proposal is not a separate document; it has been incorporated into the Contract and is part of the Contract. Consequently, IPSC is bound to abide by its agreement with ABT as expressed in the Contract; and no prompting by ABT is necessary. Although such prompting did take place as can be shown during discovery if such is necessary.

Nevertheless, when there was information that we required and were not receiving, we did in fact notify you in writing to that effect. Please see the attached letter dated September 30, 2003. This letter was faxed to James Nelson and mailed directly to you. Ultimately we received responses to items 1, 4 and 6 and were able to work around items 3 & 4. But no response was ever received for item 2; neither from Mr. Hailes, who sent the primary air mass flow data for 950MW and seven mill operation, nor Mr. Nelson to whom the letter was faxed nor from you to whom the letter was mailed (per Contract requirements).

3: **"Overheating of the Nozzle"**: This is a misnomer; there is no overheating of the nozzle. There is, however, and as we have noted several times previously, overheating of the dis-similar weld between the stainless steel nozzle and the carbon steel barrel. In exactly the same place as occurred with the original B&W equipment. The solution is exactly the same as the one IPSC and B&W used: extend the stainless steel section well behind the heat affected area so that the dis-similar weld is well out of the heat zone.

As we have noted before: ABT has never encountered this situation in any previous project with any boiler, B&W or others. Had B&W and IPSC chosen to address the cause of the overheating of the original design the current situation would not have occurred. However, that is moot now.

What is not moot is IPSC's responsibility to notify the contractor of such pre-existing conditions and problems so the contractor can adequately address them. This problem could have been easily addressed during the initial design phase.

We would also remind you of the meeting between IPSC personnel and ABT in September 2005 after we were notified of some problems. At that time ABT proposed that the mill testing be performed, that ABT would redesign the fuel injectors to the actual conditions occurring and that ABT would provide attractive pricing to IPSC. As we have subsequently, we stated that we did not intend to take advantage of errors or omissions made by IPSC.

When we were informed that all IPSC intended to do in the spring 2006 outage was to purchase some liners and any other materials ABT could recommend to alleviate the situation, we stated quite emphatically that what was most urgently needed was to move the stainless steel to carbon weld back at least 18 inches; otherwise the damage would accelerate. IPSC indicated that they intended to minimize 2006 outage costs but intended to purchase a complete set of new fuel injectors for the spring 2008 outage. ABT was subsequently proven correct in that the damage did accelerate and the accusations against ABT have been made only after further damage was seen during the spring 2006 outage.

IPSC Alternate Proposal

ABT has continually expressed the desire to work with IPSC to equitably resolve this situation and we too hope that our business relationship can continue and return to the good relations we had after the startup of our burners and the excellent performance of that equipment.

However, we clearly have major differences of opinion as to who is responsible for what.

- Our burners were designed and manufactured correctly to the conditions given to us.

- There has been no breach of Contract by ABT; quite the contrary it is IPSC who has breached the Contract by not performing the agreed upon testing, as a minimum.
- There was no way for ABT to know of pre-existing problems that would require any changes to our standard practices unless IPSC notifies us of those pre-existing problems.

Regarding the specific items of the counterproposal, we have the following comments;

1&2: ABT accepts since these are in agreement with our previous positions.

3&4: ABT rejects since we categorically deny that there is error in the design. We can easily demonstrate that in over ten years and approximately 16,000MW of boiler conversions the only site where this situation has occurred is at Delta. The problem is clear and can easily be addressed; as it could have had we been advised of the original problem.

5&6: ABT's offer is to supply replacement parts designed to the actual conditions at Delta and without profit or markup, which we feel is an excellent offer considering the situation as we have expressed it above. However, we will respond after we have had the opportunity to review this with the Siemens management.

At our meeting on November 9, 2006 ABT requested and recommended that IPSC contract with an acceptable third party, per the Contract requirements, to perform the mill measurements (primary air flow and coal flow and balance). Prior to any agreement we will require an absolute commitment from IPSC to do so. No redesign will occur until such test results are received by ABT.

While we are reviewing this letter with Siemens management we request that IPSC provide us with a letter agreeing to contracting with a third party acceptable to ABT (we have recommended FERCo or Airflow Sciences); and such commitment be sent to us by February 23, 2007.

Sincerely,

Joel Vatsky

Joel Vatsky, President

4.3

ADVANCED BURNER TECHNOLOGIES

350 Main Street, Suite 5
Bedminster, NJ 07921
P 908.470.0470
F 908.470.0479
www.advancedburner.com

September 30, 2003

Mr. George W. Cross, President and CEO
Intermountain Power Service Corporation
850 West Brush Wellman Road
Delta, Utah 84624

Attention: James Nelson, Contract Administrator

Reference: Contract 04-45606 -Unit 2 Low NOx Burners

Dear Mr. Nelson:
We are progressing with design of the IGS Unit 2 burners and in the process have determined that we require the below listed information to complete our design:

✓ 1. What is the diameter of the hole in the windbox for the existing burners. We intend to stay within this diameter for installation of our burners if possible to minimize field work. The drawing IPSC provided us of the existing burners shows a dimension for this, however the actual dimension is omitted from our version.

? 2. IPSC provided us with an average primary air mass flow of 3500 lbs/min at Unit load of 950 MW. What is the corresponding steam flow under this load condition.

? 3. What is OD and length of outer Oil gun tube and mounting tube bolt pattern? On drawing you provided us (269375E, Rev. 10) there are 2 drawings listed that would give us this information, drawings 135723A and 135724A. Please forward these drawings if available.

✓ 4. What is the number and diameter of bolt holes, as well as the bolt hole circle, for the existing elbow outlet flange? We also need to know the bolt hole orientation of the elbow outlet for each burner (i.e. is top bolt on the vertical centerline or does is straddle the vertical centerline)?

? 5. What is the size of register support brackets (channel or tube?) that run between the tube wall and the windbox wall. These are shown on drawing you provided us 294359E, however there aren't any dimension on our version.

✓ 6. What is the fuel injector tip set back dimension, from the tube wall, for the existing burners? (Throat Depth).

Please provide us with this information ASAP or advise should you require clarification on any of this requested information.

Sincerely yours,

Sal N. Ferrara

cc: C. Onaitis

IP7020689

Original ABT Proposal

Executive Summary and Philosophy

Advanced Burner Technologies Corporation is pleased to offer this proposal to Intermountain Power Service Corporation to supply and install state-of-the-art low NO_x burners for the Delta Unit #2 boiler. The specification lists several western bituminous coals, none of which, either singly or in the combinations specified, present any problem for ABT. The NO_x guarantee is 0.33 lb/MBtu is based upon what we understand to be the worst coal, SUFCO, which currently yields NO_x of about 0.45. Consequently, the NO_x will be reduced by at least 25% under equivalent operating conditions: 15% excess air and no overfire air flow. With 10% OFA flow, NO_x will be reduced to about 0.29 and with 20% to <0.25.

These values are based upon actual field experience with boilers of various sizes firing fuels ranging from lignite to PRB to eastern and western bituminous coal, as well as bit/PRB mixtures; and equipped with ABT's low NO_x burners only or these burners plus our OFA system. Consequently, we have a very high degree of confidence that these values can be attained in operation at Delta #2.

Under contract to ABT, Airflow Sciences Corporation will perform CFD models of the windboxes. This will enable us to optimize the secondary air distributions within the compartmented windbox design.

This proposal includes complete mechanical and electrical installation of all ABT supplied equipment. ABT's installation partner is Maintenance Enterprises, Inc., whose General Manager, Mike Simonds, has worked with ABT on several low NO_x conversions. These conversions include the turn-key supply and installation of low NO_x burners and overfire air systems at two 540 MW Kentucky Utilities boilers and installation of our burners on another 500MW unit at Deseret Generation & Transmission Coop in Vernal Utah. MEI, under Mr. Simonds' direction, will do an exemplary job of installing the ABT equipment.

We have the utmost confidence that the guarantees we have offered will be met.

Joel Vatsky

Joel Vatsky, President
Advanced Burner Technologies Corp

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1.0 Introduction

1.0 Introduction

1.1 Background

Intermountain Power Service Corporation (IPSC) Unit 2 is a B&W pulverized coal, supercritical boiler rated at 6,900,000 pounds of steam per hour. This unit fires western bituminous coal using 48 OEM dual register low NO_x burners. NO_x emissions typically range between 0.4 and 0.45 lb/10^6 Btu at full load as a function of coal source, with one mill out of service.

Advanced Burner Technologies (ABT) has developed a novel, highly effective low NO_x burner that has demonstrated NO_x levels in the 0.35 – 0.40 range on several large boilers firing bituminous coals, including western coal. Approximately 10,000 MW of large utility boilers have been converted to ABT's Opti-Flow™ burner design. These units range in capacity from 70 to 720 MW. In addition, ABT has implemented a novel OFA system along with its low NO_x burner, to obtain minimum NO_x without performance or operational problems. Fuels range from lignite to high sulfur bituminous coal.

Intermountain Unit 2 has a moderate burner zone liberation rate (BZLR) of approximately 300,000 Btu/hr-ft^2. For this furnace burning western bituminous coal, ABT would expect operating NO_x levels at full load to be in the range of 0.30 - 0.35 lb/10^6 Btu with a retrofit of 48 Opti-Flow™ low NO_x burners and one mill out of service; with overfire air port closed.

1.2 NO_x Control Philosophy

Advanced Burner Technologies utilizes the following considerations for attaining minimum NO_x levels while minimizing the potential for adverse furnace effects.

1. Utilize a highly effective low NO_x burner that achieves minimum NO_x emissions without overfire air.

2. Balance coal flows to the burners to eliminate very high coal flow regions that generate high LOI and CO, and very low coal flow regions that generate high NO_x.

3. Eliminate poor windbox distribution of secondary air caused by stratifications and recirculation zones that exacerbate the burner balancing problems caused by poor coal line distribution.

Note: It is ABT's experience that minimum NO_x, CO and LOI cannot be attained without addressing the fuel and air imbalances that exist in most boilers.

NO_x is generated by two different processes; fuel bound nitrogen and thermal NO_x. Thermal NO_x formation is promoted by high furnace temperatures (i.e. BZLR), which convert atmospheric nitrogen to NO_x. Intermountain Unit 2 has a moderate BZLR and thermal NO_x generation is an issue, with this furnace heat release. However, the ABT Opti-Flow™ fuel injector produces a flame that efficiently reduces fuel bound nitrogen compounds to N_2, as well as minimizing thermal NO_x formation. The Technical Discussion section contains a more complete discussion of the furnace parameters and its relationship to NO_x.

1.3 Opti-Flow™ Low NO_x Burner

The heart of the Opti-Flow™ low NO_x burner is a fuel injector that improves reliability and performance as compared to more conventional fuel injectors. The combination of the new fuel injector and a suitable low NO_x dual register, results in a low NO_x burner that attains at least 35 percent lower NO_x levels than the conventional designs of low NO_x burners it has replaced.

The Opti-Flow™ low NO_x, flame stabilization nozzle is the key element of the fuel injector for attaining excellent flame stability along with minimum NO_x. Excellent flame stability is achieved due to external flame stabilizers surrounding each segment. Nearly uniform fuel distribution around the burner nozzle circumference is obtained, which provides significant aid in attaining minimum NO_x and UBC simultaneously.

Advanced Burner Technologies utilizes high quality stainless steels for all parts of the fuel injector that face the furnace, as well as stainless steel castings for all complex parts. The result is high reliability and excellent longevity of the burners.

ABT's Opti-Flow™ dual register is an innovative design that provides the operator with the flexibility of optimizing: inner and outer zone swirl values and the air flow split between the inner and outer zones independently of swirl. This is accomplished with a manually adjustable inner air damper and represents a significant improvement over other dual register designs. A fixed vane swirler is fixed to the outer barrel of the fuel injector to impart swirl to the inner air zone.

1.4 Analytical Evaluations

CFD (Computational Fluid Dynamics) is an analytical tool that aids in the design of air delivery systems. CFD allows us to evaluate alternatives and provide an optimized system without modifying the system after installation. Air supply systems in a boiler are so complex it is impossible to optimize a system using conventional duct design techniques. Consequently CFD analysis is utilized for the following:

- Optimize air flow distribution to the burners within the existing wind-boxes.
- Minimize pressure loss in ducts

For Intermountain Unit 2, a primary area of investigation is CFD modeling of the wind-box air flow. Airflow Sciences Corporation (ASC) will develop a model of the wind-box and secondary air ducts, in order to evaluate the air flow distribution to the burners within the windboxes and the air flow to each individual burner. The results will be used to design any turning vanes, baffles or other distribution devices to improve air flow within the ducts and windboxes.

Note, that this B&W boiler uses compartmented windboxes that do not act as true plenums. Consequently, secondary air flow is not uniformly distributed to the burners within the windbox; and it has been ABT's experience that these windbox flows can be unstable.

ABT has a means of eliminating the instability and minimizing burner-to-burner secondary air imbalances by converting each compartment into a nearly true plenum. The cost for this is very moderate and it's effectiveness has been shown in the field on a 560 MW B&W boiler.

IP7020698

IP7020699

2.0 Technical Discussion

The NO_x emission from any given boiler is a function of several variables:

- Furnace size relative to full load heat input: The larger the furnace for a given heat input, the lower the temperatures will be. Therefore, thermal NO_x will be lower. This parameter, Burner Zone Liberation Rate, is expressed as Q/BZS.

- Fuel Parameters: The fuel constituents which have the largest impact on NO_x are N_2, HHV, and FC/VM.

- Burner Design: The design of the burner produces the largest effect on both combustion and NO_x emissions. Very low NO_x levels can only be attained with a highly effective low NO_x burner.

To determine the NO_x level a boiler is capable of generating with a given low NO_x burner, a comparison is made of that boiler with a unit that has similar BZLR, fuel parameters, and the same burner design.

2.1 Boiler Comparisons and ABT Experience

Burner Zone Liberation Rate (BZLR) is the ratio of heat input to the furnace (Q) to the Burner Zone Surface (BZS). The following calculation of BZLR is summarized below:

$Q = w_f\,[\,HHV + (\#\ air / \#\ fuel)\,(0.248)\,(T_a - 80)\,]$

Where: w_f = fuel flow (lb/hr) and T_a = secondary air temperature

BZS = 2 (WD + WH + HD)

(The BZS is the six-sided box that surrounds the burners.)

Where: W = unit width, D = unit depth, H = wall height from the hopper knuckle to 10' above the top burner level.

For Intermountain, using the design coal analysis:

$Q = 9038 \times 10^6$ Btu/hr

BZS = 29,566 ft^2

BZLR = Q/BZS = 305,700 Btu/hr/ft^2

ABT considers NO_x emissions of 0.30 - 0.35 lb/10^6 Btu with western bituminous coal to be attainable with the Opti-Flow™ low NO_x burner, with OFA ports closed. Our

IP7020700

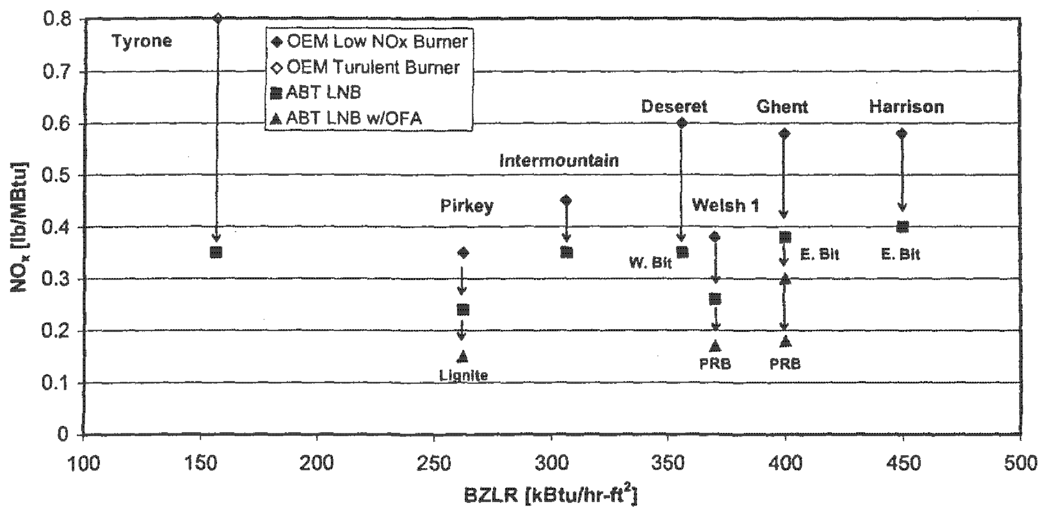
experience with the Opti-Flow™ burner on a boiler with similar BZLR firing western bituminous coal has demonstrated that a NO_x level of 0.35 lb/10^6 Btu is attainable.

Figure 2-1 compares NO_x levels as a function of BZLR for several cases:

a) OEM low NO_x burners (B&W and Foster Wheeler) firing bituminous coal for three (3) boilers. The data indicate that there is little difference between the B&W and FW low NO_x burners of that early vintage.

b) Data for Deseret Bonanza Unit one which has a BZLR similar to that for Intermountain. In addition, this boiler fires a western bituminous coal with characteristics similar to the coal(s) fired at Intermountain.

Figure 2.1 Low NOx Burner Comparison
NO_x vs. Burner Zone Liberation Rate



Shown in Figure 2-1 is data for the following six boilers firing lignite, PRB and bituminous coal:

<u>**Deseret, Bonanza Unit 1:**</u> A 440 MW Foster Wheeler boiler, firing western bituminous coal similar to the worst Intermountain coal, was retrofitted in May 1997 with 20 Opti-Flow low NO_x burners. NO_x emissions before the retrofit, with the original Foster Wheeler low NO_x burners, were typically in the 0.55 to 0.6 range. After the retrofit, with the ABT low NO_x fuel injectors and dual register modifications, NO_x is approximately 0.35. In 2001, three of the five mills were replaced with larger units and the new mill's burners were upgraded to handle the higher capacity. The boiler now produces 500 MW with no increase in NO_x or detrimental impacts to boiler performance. Burner coking and fires have been eliminated, as have burner eyebrows and furnace slag.

Deseret Contact: Dan Howell 435-781-5718

IP7020701

AEP/SWEPCO, Welsh #1: A 560 MW B&W boiler with 42 burners (NO_x with OEM dual register low NO_x burners was ~0.38). Unit was retrofitted with ABT Opti-Flow Mark I burners in the fall of 1999; initially no OFA ports were installed. Operating with one top burner deck out of service, NO_x was typically in the 0.20 to 0.22 range.

In the fall of 2001, ABT's OFA system was installed at Welsh #1. With the OFA ports open, NO_x has been reduced to the 0.16 – 0.17 range with all mills in service. It is apparent that significant coal line imbalances exist at Welsh #1; these imbalances limit the degree of NO_x reduction that can be achieved, since they result in high CO emissions. Although the unit was designed for operation with 19% excess air, it must currently operate with approximately 25% excess air in order to control CO. Minimizing these coal line imbalances will allow operation at near design excess O_2 or below and reduce the NO_x to the 0.15 level.

AEP/SWEPCO, Pirkey #1: A 700 MW B&W boiler firing Texas lignite (NO_x with OEM dual register low NO_x burners was ~ 0.36 to 0.38). The unit was completely retrofitted with 56 ABT Opti-Flow Mark II Low NO_x burners and OFA system in the fall of 2001. NO_x emissions, with the OFA ports closed, have been lowered to approximately 0.22. Operation of the OFA system has been very successful in that the boiler can operate continuously at full load with NO_x emissions of ~ 0.15 lb/10^6 Btu with one mill out of service (normal operation).

AEP Contact: Kent Randall 318-673-3813 Welsh & Pirkey Plants

Kentucky Utilities, Ghent #3 and #4: Two 540 MW FW boilers firing Kentucky bituminous coal. NO_x emissions of 0.55 to 0.7 without OFA and about 0.45 with OFA ports open were attained with the OEM low NO_x burners and OFA system. ABT replaced all 24 fuel injectors, with the Opti-Flow Mark I design, upgraded the FW dual registers and supplied a new OFA system to each boiler. Unit #3 was converted in the fall of 1998 and Unit #4 in the fall of 1999. NO_x was reduced to about 0.40 while firing Eastern bituminous coal and 0.23 for PRB coal, with OFA ports closed; and to 0.3 and 0.18 respectively with OFA ports open. Currently, NOx is about 0.3 firing a 50/50 blend of E. bituminous and PRB with OFA ports closed.

The walls of these boilers are coated with refractory to maintain furnace temperatures and to attain design steam temperatures (low steam temperatures resulted from an OEM boiler design problem). Prior to the retrofit, there were frequent heavy slag falls from the walls; however not a single slag fall has been observed following the retrofit.

Ghent Contact: Steve Nix 502-347-4152

Allegheny Energy, Harrison #1, 2 and 3: Three 660 MW FW boilers that are of pre-NSPS design with very hot, tight furnaces firing a highly slagging, eastern bituminous coal. All units were upgraded by replacing the fuel injector with the ABT design, while maintaining the existing FW dual registers. NO_x emissions have been reduced from the 0.55 to 0.6 range to below 0.45 without overfire air. The furnaces are clean with no evidence of any operating or performance problems, due to the new low NO_x burners. Unburned carbon is in the same range as before the retrofit.

Harrison Contact: Dean Hedrick 304-584-2350

<u>Tyrone Unit#3/ Green River Unit #3:</u> These are 70 MW B&W boilers each originally with eight turbulent burners firing Eastern bituminous coal. Tyrone was started up in fall 2001 and Green River in spring 2002.
NO_x has been reduced from about 0.8 to below 0.35 lb/10^6 Btu without OFA. There was no increase in UBC and no deterioration in boiler performance or efficiency.

Tyrone Contact: Tom Moore 859-879-3501
Geen River Contact: Tom Troost 270-757-3113

<u>JEA St. John Unit #1:</u> A 660 MW Foster Wheeler boiler that fires a blend containing 20% petroleum coke and 80% bituminous coal with 28 burners; more petroleum coke is fired in this boiler than any other pulverized coal boiler in the U.S. In addition, Colombian coal is fired in this blend, which makes it an even more difficult fuel since this coal is commonly known to be difficult to burn.

In early 2003, St. Johns Unit 1 was completely retrofitted with 28 Opti-Flow™ LNB's and similar windbox/secondary air modifications. Preliminary burner tuning has shown that NO_x has been reduced by over 20% for Unit 1; further reduction in NO_x is anticipated once additional burner tuning is completed.

Excellent flame stability has also been attained with the retrofit of Opti-Flow™ burners for Unit 1. In fact, the petroleum coke blend can now be fired in the lower rows of burners without flame stability problems. Excellent flame stability is also maintained as load is reduced from 670 MW to 380 MW, with only one mill out of service (normal operating practice with these boilers). Prior to the retrofit of Opti-Flow™ burners, this turndown could not be achieved with only one mill out of service. To date, ABT is the first to demonstrate the ability to cofire petroleum coke in a wall-fired boiler with an advanced low NO_x burner that maintains such excellent flame stability and NO_x reduction.

St. Johns Contact: Bob Branning 904-665-8806

Of particular note from the data shown in Figure 2-1 are the following:

- **Opti-Flow™ low NO_x burners result in a relatively flat BZLR curve by minimizing thermal NO_x formation.**

- **At the high BZLR values of Deseret, Ghent, and Harrison, the Opti-Flow™ burner NO_x level is at least 35% lower than the OEM's low NO_x burners.**

- **NO_x shows only a slight dependence on BZLR for boilers with ABT low NO_x burners. The BZLR for Intermountain is similar to Deseret, which show NO_x emissions of 0.35. This data indicates that a NO_x level of 0.33 is attainable for Intermountain at 15% excess air and OFA ports closed.**

2.2 Opti-Flow™ Low NO_x Burner:

ABT's Opti-Flow™ low NO_x burner generates a very bright, intense flame that does not look like the classical low NO_x flame: its intensity is more akin to that of classical turbulent burners. Yet, the NO_x levels are typically more than 35 percent lower than those generated by competitors' low NO_x burners that ABT has replaced firing bituminous coal and more than 40% lower than those firing PRB. This NO_x reduction result has been attained without any additional UBC penalty.

The Opti-Flow™ low NO_x, flame stabilization nozzle is the key element of the fuel injector for attaining excellent flame stability along with minimum NO_x. Excellent flame stability is achieved by incorporating external flame stabilizers surrounding each nozzle segment. The segmented coal nozzle has an open design with no obstructions to wear or to collect coal. Nearly uniform fuel distribution around the burner nozzle circumference is also obtained, which provides significant aid in attaining minimum NO_x and UBC simultaneously. Pressure drop is minimal and there are no components in the coal path that would be subject to wear, coal accumulation, or coking.

Advanced Burner Technologies utilizes high quality stainless steels for all parts of the fuel injector that face the furnace, as well as stainless steel castings for all complex parts. The result is high reliability and excellent longevity of the burners.

ABT's Opti-Flow™ dual register is an innovative design that provides the operator with the flexibility of optimizing inner and outer zone swirl values, and the air flow split between the inner and outer zones independently of swirl. This is accomplished with a manually adjustable inner air damper and represents a significant improvement over other dual register designs. A fixed vane swirler is attached to the outer barrel of the fuel injector to impart swirl to the inner air zone.
In order to be most effective, any low NO_x burner must operate in an external environment that provides proper conditions needed for optimal combustion at each burner. There are two operational areas that are extremely important for best burner performance with minimum flame length:

a) Known and accurately controlled primary air flow along with other sources of air which enter the fuel injector: such as auxiliary air and seal air. ABT has sized the fuel injector proposed here based on the PA flow contained in the OEM mill curves for Intermountain Unit 2. This primary air flow must be verified during pre-retrofit testing.

b) PA/coal flows between burners must be as balanced as possible. Significant imbalances in either PA or coal flows will yield:

- Longer flames on some burners.
- High NO_x from the burner with low fuel flow
- High UBC from the burner with high fuel flow
- High windbox pressure caused by an attempt to force an excessive amount of air to the high fuel burners.

This problem is generated by both unequal coal pipe lengths (resistance) and external mill stratifications. ABT's experience is that the proper use of adjustable coal pipe orifices can alleviate this problem to a considerable degree.

2.2.1 Fuel Injector for Intermountain Unit 2

The key components of the fuel injector include:

a) Fuel Distribution System: Flow enhancing fuel distribution system yields nearly uniform coal distribution at the burner nozzle. Uniform coal distribution helps to minimize NO_x and prevent significant increase in unburned carbon. This will be shop installed into the existing ceramic lined sweep elbows.

b) Low NO_x Opti-Flow™ Segmented Burner Tip: Cast stainless steel open coal nozzle with integral external flame stabilizers promotes internal fuel staging reactions which result in minimum NO_x, yet provide extremely stable, bright flames.

2.2.2 New ABT Opti-Flow Dual Registers with Fuel Injector

ABT's complete dual register, described in detail in Section 7, will be installed in combination with our fuel injector. The improvements in air flow control and operability will amplify the fuel injector's ability to control NO_x. Minimum NO_x with optimal flame shape should then be attainable. The ABT dual register design provides the following:

- Optimized secondary air flow to the burners (nearly equal total air/coal ratios) accomplished by adjustment of individual burner dampers.

- Independent control of secondary air swirls and flow distribution within the burner.

2.3 Analytical Evaluations

Airflow Sciences Corp (ASC) will develop a CFD model of Intermountain's burner windboxes and duct work. ABT's experience is that the B&W compartmented windboxes, with air flow control by louvered dampers, is inherently unstable. This modeling will identify regions where turning vanes and baffles will be needed to optimize flow to the burners, while minimizing pressure drop.

2.4 Testing

IPSC will contract the following testing and analytical services that will be witnessed by ABT's service personnel:

- Pre-retrofit testing will be conducted within three weeks following contract award to verify the primary air flow to the inlet of all of the mills. These tests will be conducted with one mill out of service and three mill loads: maximum, 70% and 40%. Maximum mill load corresponds to boiler full load with one mill out of service.

  Isokinetic coal samples will be taken to evaluate the coal pipe balance. Those mills that have balance worse than ±10% from the mean will need to be balanced.

- A short boiler Baseline Test program will be performed in order to develop baseline data. Emissions and boiler performance data will be taken over the control range of the boiler with all mills in service.

- Emissions testing will be conducted immediately following start-up of the new combustion system. If not currently installed, during the outage the plant should install taps in the flue, upstream of the air heater. Probes will be placed in each tap for a complete grid. NO_x, O_2, and CO will be sampled during the start-up and burner optimization period after the outage. Unburned carbon will be sampled in the same manner as done for the baseline. Start-up, optimization and operational testing are expected to take no more than four weeks.

2.5 ABT Support Personnel

Lead ABT personnel, having > 20 years experience, that would support the Intermountain project are:

Name	Location	Phone No.
George Schiazza-Lead Service Engineer	Jacksonville, FL	904-272-8923
Tarkel Larson-Service & Sales Manager	Chattanooga, TN	423-899-8918
Sal Ferrara-Proposal & Project Manager	Bedminster, NJ	908-470-0721
Chuck Onaitis-Engineering Manager	Bedminster, NJ	908-470-0722

IP7020706

3.0 Scope of Work

3.0 Scope of Supply

Following is the scope of supply offered by ABT for the project.

3.1 Opti-Flow™ Low NO_x Burners

Forty-eight (48) Opti-Flow™ low NO_x burner modules with the following features.

- ABT's fuel distribution system consisting of silicon carbide and ceramic tile-lined components that will be installed in the existing ceramic tile-lined sweep elbow.
- A straight fuel injector with a cast HE tip for thermal resistance and long life.
- An inner air zone with a manually operated sliding damper for inner versus outer air flow distribution control and a stationary fixed vane spinner.
- A manually operated sleeve damper for total burner secondary air flow control and burner air flow balancing.
- Manually operated outer zone, axial spin vanes.
- Materials will be ASTM297 grade HE castings, 309 SS (in high heat affected areas), 304 SS, and carbon steel where appropriate.
- Burner front windbox cover plate.
- New windbox/burner adapter ring.
  Note: ABT has found that some windbox front plates can be warped, resulting in a variation in distance between the windbox plate and the waterwall throat. To provide an easier installation, ABT is providing a seal ring that will slide into the existing windbox opening and allow easier fit-up by compensating for windbox to waterwall variations. The seal ring would be field welded to the windbox (the register front plate comes from the factory bolted to the seal ring.)
- Two thermocouples, each with terminal connection head mounted on burner front plate, for plants use in remote monitoring of burner tip and barrel temperatures.
- Plug-in design requiring no modifications to the windbox, waterwalls or existing burner support rails.
- Burner seal ring to attach to the existing burner throat seal plate.
- All gaskets, nuts, bolts and washers required for field assembly.
- Burner flame view port with purge air connection and ball valve assembly.

3.2 Flame Scanner Systems

ABT offers a replacement flame scanner system, including scanners, amplifiers and connection cables. The base scope includes supply of an IRIS system. Option for supply of an ABB system is also offered that, if selected, would result in a price adder of the amount listed in proposal Section 5.

IP7020708

Both ABB and Iris have extensive experience and success with their systems. ABT's burner design is easily adaptable to either system. Our burner flame shape and intensity allow for reliable flame scanning. In this case we do not have preference of one scanner system over the other. Experience lists and detailed scope of supply for both systems are included in Appendix A-2 of this proposal.

Fifteen (15) man-days, 8 hr/day, of flame scanner system startup and operational testing time and two (2) man-days, 10 hr/day, hands-on training time for plant personnel is included in the pricing for supply of either system.

3.3 Individual Secondary Air Flow Measurement

Each burner assembly will be equipped with an Eastern Instruments (EI) DPU-Differential Pressure System. Four (4) VAP3™/PA Pitots will be positioned equally around the circumference of the burner register. Shop installed tubing will connect pitots to fittings mounted on the burner module's front plate. Eight (8) NEMA 4 cabinets, one for each burner elevation, will be supplied with factory installed differential pressure transmitters and root valves. Tubing between cabinets and burner modules will be supplied and field installed. Local indication will be displayed at the transmitter cabinets where terminals will also be provided for the plant's use, should indication in the control room be desired.

We selected the EI system for our burners for its durable, accurate, and maintenance-free design. The VAP3™ /PA with its reverse sensors is designed to operate in heavy particulate environments where dust and granular residue may be present. Also, due to its unique Velocity Averaging™ and Parallel Plate™ patented design, the VAP can be installed in locations where random flow distribution may be present. More detail on features of the VAP is provided in Appendix A-3 of this proposal.

Four (4) man-days of EI startup and hands-on training time for plant personnel is included in supply of the EI measuring system.

3.4 Flow Modeling

In order to achieve balanced airflow to the burners, CFD modeling is required. ABT will subcontract to Airflow Sciences Corporation (ASC) to develop a model for the secondary air duct and burner windboxes. The model will be utilized to evaluate the air flow distribution to the burners. The results will be used to design any turning vanes, baffles or other distribution devices needed to improve airflow within the ducts and windboxes.

Materials (typically carbon steel baffle plates and turning vanes) will be supplied and installed where necessary as depicted by the model.

3.5 Drawings and Operating Manuals

Documentation of the proposed equipment and materials, including arrangement drawings, field installation, and operating instructions will be supplied to IPSC in the format, quantities and time frame requested.. Fabrication drawings would be available for IPSC's review in our office, or at the respective fabrication shops.

3.6 ABT Field Services

ABT will dispatch an engineer for field installation and testing support to assist during the initial stages of installation, startup check-out and during optimization of the new combustion system. Included in this proposal are a total of 40 man-days of ABT technical service support for erection, start-up, optimization and operational testing. Should additional service time be requested by IPSC, it would be billed at $1000.00 per eight (8) hour day and time over 8 hours will be billed at a rate of $187.00/hour. Travel and living expenses associated with additional ABT support services would be billed at cost.

3.7 Mechanical and Electrical Installation

ABT will subcontract erection services to Maintenance Enterprises Inc (MEI). Firm prices associated with the installation is entered on the bid form "Bid Pricing Sheet". Appendix A-4 contains conditions and schedule associated with MEI's proposal for the installation scope of work.

IP7020710

4.0 Guarantees and Warranties

4.0 Guarantees and Warranties

4.1 Workmanship and Quality:

ABT shall warrant the workmanship and quality of the supplied parts from the start-up date for a period of 12 months and 48 months for coal nozzle tips. ABT will supply a replacement for any supplied part which suffers a catastrophic failure due to design or workmanship flaws. IPSC will provide complete access to any supplied part that fails, including removal of any equipment that prevents access to the part to be replaced or repaired and removal and reinstallation of any complete ABT-supplied assemblies that cannot be repaired in-situ.

Changes to the appearance and dimensions of any part will be considered failures only if guaranteed emissions are affected to the extent that the unit is out of compliance and readjustment of burner operating parameters fails to return the emission to within guarantee level; and there are no changes to other equipment, operating methods, or fuel supply which could result in changes to the emissions.

The following requirements apply to both the material warranty and the below listed guarantees:

- Primary air flows shall be within ± 5% of the mill manufacturer's design primary air flow vs. coal flow curve
- Mills will not be operated at full load with more than one burner out of service.

4.2 Reliability

The Opti-Flow™ fuel injector components will prevent coal layout and dropout as well as the potential resultant coking inside the fuel injector during normal start-up and operation. Failures caused by other equipment are excluded, for example: mill and control system problems, igniters, or failed/stuck burner shut-off valves.

4.3 Pressure Drop

4.3.1 Fuel Injector

The pressure drop across the new fuel injector, as measured between the inlet flange and the furnace, at the respective elevation, will be no greater than with the existing burner. The new fuel injectors will not limit boiler load.

4.3.2 Secondary Air

Windbox pressure will not exceed 2" W.C., with overfire air ports (to be supplied by others) open

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Note: ABT will supply appropriate secondary air duct and windbox turning vanes and baffles to minimize secondary air mal-distributions to the windboxes and instabilities within each windbox.

4.4 NO_x

ABT guarantees that NO_x will not exceed 0.33 b/10^6 Btu, with overfire air ports closed, at the design excess air of Section 4.6 and 100% MCR.

ABT predicts that NO_x with OFA ports open, with a flow of 20% of the total combustion air, will be less than 0.25 lb/MBtu.

NO_x is a function of several fuel variables, primary among them is fixed carbon to volatile matter (FC/VM) ratio and % fuel-bound nitrogen. Figure 4.1 represents the change in NOx guarantee parametrically in FC/VM against fuel nitrogen content as lb. $N_2/10^6$ Btu.

Note: The guarantee point represents the fuel properties specified in Section 4.9: 1.2% N_2 and 11.500 Btu/lb corresponds to 1.04 lb $N_2/10^6$Btu.

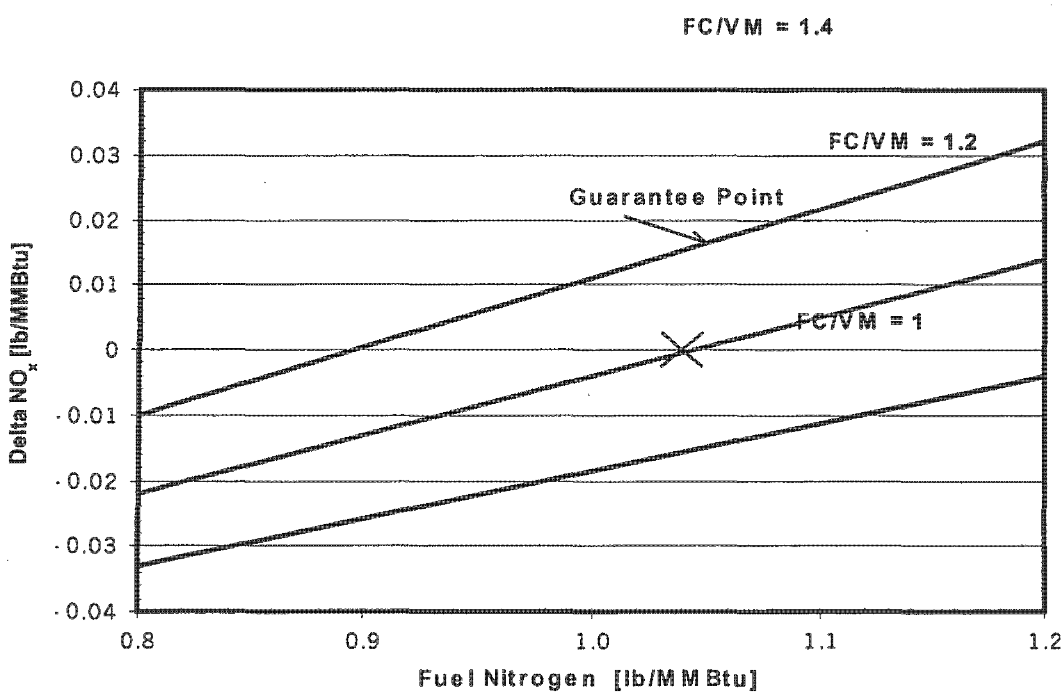

Figure 4.1 Change in NOx vs. Fuel Properties

IP7020713

Short-term periodic exceedances will be permitted provided the NO_x level returns below the guaranteed level after the unit stabilizes. This is necessary to accommodate potential NO_x variations during rapid load changes and while mills are coming in and out of service.

NO_x performance testing should be performed with both the CEMs and the economizer exit grid in operation. If the low NO_x system fails as indicated by CEMs but is within guarantee by the economizer exit test instruments, the latter shall govern and the CEMs shall be recalibrated against the test instruments.

4.5 CO

CO will not exceed an average of 200 ppm, with overfire air ports closed, at the boiler excess air as specified in Section 4.6 over boiler steam temperature control range, provided the fuel/mill conditions of Section 4.9 are met and that secondary air flows in each duct are steady and approximately equal (flow variations caused by plugged or unbalanced air pre-heaters are to be minimized).

4.6 Excess Air

The full load boiler excess air level at the burners will not exceed 15%. ABT will have the option of recommending a minimum O_2, across the respective boilers' steam temperature control range, at which NO_x, CO and LOI guarantees are simultaneously achieved, without deteriorating boiler performance.

4.7 Unburned Carbon Expressed as Loss On Ignition

LOI will not exceed the values obtained in pre-outage baseline testing; with overfire air ports closed with no more than 5% leakage/cooling air flow. This LOI level is guaranteed provided the conditions of Sections 4.6 and 4.9 are met; and the post retrofit LOI is sampled and measured using the same methods as in the pre-retrofit testing.

4.8 Boiler Performance

Boiler performance will not be deteriorated from the performance obtained during the baseline tests. Commercially acceptable variations in individual measured data will be acceptable (i.e., super heat temperature $\pm$ 10° F, etc.).
Boiler efficiency will not be lower than the baseline measurements, corrected for excess air and fuel conditions.

4.9 Mill and Fuel Conditions

The above guarantees are predicated on the following:

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- **Mill Performance:**
  Air Flow: The low NO_x burners will be designed to slave to the mills' operation in that the fuel injector will be sized to follow the mills' primary air flow characteristic. Consequently, ABT will design the burners for the full load primary air flow, per mill, as per the OEM mill curves, with one mill out of service at boiler full load. Primary air flow must reduce as mill load decreases. PA flow will be determined during pre-retrofit testing defined in this proposal Section 2.4.

  Coal/PA Flow Balance: The balance between coal pipes within a given mill is to be within ±10% of the mean for that mill. (ABT recognizes that this is difficult to accomplish on all mills. Consequently, we will accept one of the eight mills being outside this range, to maximum of ±15%).

- **Fineness:** 99.5% < 50 Mesh and 70% < 200 mesh; all mills simultaneously.

- **Coal Properties:** Western U.S. bituminous:
  HHV > 11,500 Btu/lb; $N_2 \leq 1.2\%$; FC/VM ≤ 1.2; Ash ≤ 12%

4.10 Burner Load Variation

The nominal burner heat input at boiler full load with one mill out of service, is approximately 192 Mbtu/hr.

The ABT low NO_x burner's flame will remain stable at a load greater than 220 MBtu/hr, and less than 95 MBtu/hr.

Maximum secondary air flow at 220 MBtu per hour and 15% excess air, with 10% OFA flow will be no less than 124, 240 lb/hr.

Minimum secondary air flow will be determined by balancing the burner stoichiometry against the overfire airflow necessary to maintain minimum NO_x. Note that 45% load is below the steam temperatures control range listed on the B&W summary performance sheet.

4.11 Ash Patterns

The low NO_x system shall not increase or adversely alter the pattern of ash deposits on the furnace walls or high temperature superheater tubing such that existing soot blowing and/or steam de-superheating sprays cannot maintain tube cleanliness or steam temperatures. Furthermore, the burners shall not cause increased buildup of slag deposits around the burner openings (i.e., eyebrows).

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4.12 Remedies for NO_x , CO and LOI Exceeding the Guarantee Values

ABT is offering a low NO_x combustion system consisting of state-of-the-art low NO_x burners. Since there are no technical combustion remedies currently available to correct a failure to meet specific combustion guarantees (if there were ABT would have included them within the original design) specific remedies are proposed.

Although we expect to meet the offered guarantees, we are proposing the following remedies in the event that NO_x/LOI/CO levels are not attainable.

4.12.1 Financial Remedies

a) NO_x Remedy

In the event that the NO_x guarantee is exceeded during the performance test and there are no combinations of burner adjustments that reduce the NO_x level to within the guarantee value, ABT will be permitted to adjust excess O_2 to reduce the NOx level to within the guarantee level, provided the requirements of Sections 4.8 and 4.10 are simultaneously met (i.e., no deterioration of boiler performance or ash patterns).

Liquidated Damage for NO_x: In the event the NO_x guarantee is not attainable ABT shall pay a liquidated damage of \$50,000 per 0.01lb$NO_x/10^6$ Btu

b) LOI Remedy

In the event that the UBC guarantee is exceeded during the performance test, ABT will be permitted to readjust the firing system to reduce UBC to within guarantee levels. If there are no operational remedies and the criterion for the mills' fineness, performance, and coal are being met, ABT will pay a liquidated damage of \$25,000/ 0.1% UBC in the fly ash.

c) CO Remedy

In the event that the CO guarantee is exceeded during the performance test, or as a result of the NO_x remedies of 4.9.1, ABT will pay a liquidated damage according to the following formula:

CO L.D. (\$) =100 [Meas. CO – Guar CO] , where CO is in ppm corrected to 3% O_2.

4.13 Vendor Equipment

ABT will pass-through to IPSC the guarantees and warrantees for vendor-supplied equipment the Vendors offer to ABT.

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5.0 Pricing & Schedule

5.1 Pricing: Pricing for base scope is provided on bid form "Bid Pricing Sheet".

5.1.1 Option: Adder to Supply ABB Flame Scanners per Section 3.2...**$ 55,385.00**

All prices include freight, FOB Delta, Utah.
Pricing quoted is subject to acceptance within 120 days of date of quotation.

5.2 Payment Schedule

20% - Invoice Upon Award
20% - Upon submittal of burner general arrangement drawings.
20% - Upon commencement of burner fabrication
30% - Upon receipt of the equipment at the job site in good condition *
10% - Upon successful start-up**

Payment Terms - Net 30 days from date of ABT invoice. Payments made later than 30 after date of invoice will incur 1.5% per month interest charge.

* Early material shipment to be acceptable, with equipment storage by IPSC. The 30% payment upon receipt of equipment shall be prorated based on percent of major material items delivered.

** Retention applies to Low NO_x equipment supply only. Installation and sub-supplier equipment and services are excluded from retention.

5.3 Delivery Schedule

The following schedule is based upon an award date of September 5, 2003.

a)	Award -	9/5/03
b)	Burner Drawings for Review and Initial Procurement -	11/03/03
c)	Commence Fabrication	12/01/03
d)	Commence Equipment Shipment	01/09/04
e)	Complete Equipment Shipment	02/13/04
f)	Commence Outage (see Appendix 4 for installation schedule)	02/28/04
g)	Start-up	3/24/04
h)	Optimization Complete	4/07/04
i)	Guarantee Testing Complete	4/13/04

5.4 Recommended Spare Parts

ABT does not recommend any spares associated with the fuel injector or burner register assemblies as there is low risk of failure and our customers have not seen the need for stocking any of the associated parts. The longest lead parts are castings, for which we maintain the patterns, that can be supplied within 1- 2 weeks.

Reference Appendix A-2 of this proposal for Flame Scanner System recommended spares lists.

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6.0 Comments and Exceptions
to the Terms and Conditions

6.0 EXCEPTIONS AND CLARIFICATIONS

6.1 PART A DIVISION A1: NOTICE

1. Bid Validity:

   Bid Validity: 120 days required
   Delivery, February 23, 2004
   Release, September 5, 2003 — 24 weeks

   Delivery will delay day by day for each day contract release extends beyond 9/5/03.

2. Performance Bond

   A construction performance bond in the amount of 50% of the installation cost shall be supplied, if requested, the cost of which is approximately $15,000.00. This bond will terminate upon successful completion of the installation and customer acceptance.

   Instead of a 10% performance bond for equipment, ABT requests that IPSC use 10% retention to be released upon successful performance testing of the boiler.

6.2 PART B - DIVISION B1: INSTRUCTIONS TO BIDDERS

9. Award of Contract:

   If ABT is awarded this contract we would commence design work immediately, not upon execution of the contract by IPSC.

12. Performance Bond:
    Please see comment 2, Section

6.3 DIVISION B2, SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

Article 2: Incentives and Liquidated Damages

2nd Paragraph: Change to read: For completion ---- Contractor will be awarded $50,000 per day bonus.

3rd Paragraph: Change to read: For incomplete ------will be assessed $50,000 per day of delay.

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Additional Clarification to Spec. 45606

6.4 **Part C-Division 3**

1g. Bid form, Spec Page C-2, submitted with our proposal listed the max. and min. limitations of our offered equipment as being 2000^0 F and 140^0 F for the "Burner Tip" and "Scanner Electronic", respectively. Our design for specific components is based on their expected temperature exposure with the following limitations:

Component Description	Material Limitation, ^{0} F
Those exposed to direct furnace radiation, i.e. flow divider, spin vanes, throat casting, register front cone, fuel injector tip and flame stabilizers.	2000
Those semi-shielded from furnace radiation i.e. fixed vane spinner and inner zone damper perforated plate.	1600
Those shielded from furnace radiation, set back from furnace opening, and exposed to maximum windbox temperature, i.e. register sleeve dampers, register backplate, windbox coverplate, fuel injector barrel, elbow flatback and fuel distributors.	750

Explanatory Comment: The reason we stated that there are no environmental limitations to the coal burners is that the stainless steel castings and plate facing the fire, ASTM 297 Gr HE or 309 will not deteriorate at temperatures of at least 2000 F. We have never measured tip temperatures above 1600 F, in pre-NSPS furnaces that have input per plan levels as high as 2.3MBtu/hr/ ft^2 and Furnace Exit Gas Temperatures or 2400F and firing Eastern bituminous coals. These are a good deal higher than Intermountain and generate higher gas temperatures.

Consequently, we do not consider that operation of our design in your boiler to have any environmental limitations: the conditions are such that no material will operate anywhere near its limit. In fact we have placed no such limitations on any retrofit we have done.

1h. We will not require any special modes of operation in that the existing burner controls should not require changes. Burners will be setup during optimization (at 100% MCR) which will begin with components at predetermined positions similar to the following example:

Burner Secondary Air Sleeve Dampers (SAD)	80% Open
Burner Outer Air Registers Spin Vanes	40% Open
Burner Inner Air Sleeve Damper	20% Open

Following start-up these components are used to control the shape and ignition point of the flame, which in turn controls NOx, O2 distribution and CO emissions. The final settings are tabulated and provided to the customer for future reference. During normal operation, following optimization, further adjustments should not be necessary unless a significant change in fuel supply characteristics occurs.

In no case have we required any customer to modify normal procedures to accommodate our burners. However, as noted in the guarantee section, we do require good fuel balance in the coal pipes, accurate primary air flow measurement and control and that the Primary air flow decrease as mill load decreases. We do not consider these to be "special modes of operation"; rather good operation.

Delete: "In the event the burner supplier does not provide for the installation---- penalty clause applies:"

Change boxed clause to read: "For delivery of all burner ----- components contract price". Delete last sentence.

Delete remainder of Section 2.

ABT anticipates shipments to the IPP job site will begin in early January, prior to installation contractor arrival on site. In case of early shipments, IPP would be responsible for off loading and storage of equipment.

6.4 PART C - DIVISION C3

Bidding Documents - Additional bid

1 b. There are no normally recommended or required spares. However, the plant may choose to have our fuel injector assembly (barrel & nozzle) on site in the event that a burner might be damaged by some external cause.

g. There are no environmental limitations to the coal burners

h. The coal burners will slave to the mills. There are no special modes of operation.

i. There are no special maintenance requirements. ABT suggests that, fly ash be cleaned from adjustable register components at the commencement of an outage if the boiler is to be water cleaned.

j. There are no required boiler modifications to accommodate the new burners.

6.5 DIVISION E1, GENERAL CONDITIONS

Article 5: Fabrication drawings and burner design calculations will not be supplied however will be available at the fabrication shop, or at our engineering office, for reference during visits by IPSC.
Drawings anticipated for delivery to IPSC include:

a. General Arrangement Drawings showing equipment arrangement.
b. Field Installation Drawings.
c. Instruction manuals for supplied equipment.

Article 13: Add at end of paragraph, "In no event shall Contractor be liable, whether in contract, tort (including negligence), warranty, strict liability, or any other legal theory, for any indirect or consequential damages, such as, but not limited to: cost of capital; loss of anticipated profits or revenue; loss of use or increased expense of using equipment or plant; loss of power or production; cost of purchased or replacement power or production; or claims of customers for loss of power or production."

6.6 DIVISION E2, ADDITIONAL GENERAL CONDITIONS

Article 1: ABT's offer is based on Warranty and Guarantee conditions as written in Section 4 of the Proposal.

6.7 DIVISION F1, DETAILED SPECIFICATIONS - SPECIAL CONDITIONS

Article 3: Delivery
Add: Notwithstanding the above, IPSC agrees to accept early delivery of burners if ABT's shop is ready to ship. Burners will be stored indoors at the site and unloaded by IPSC.

Article 6: General ABT Clarification on Insurance
The following clarifications to specific portions of this article are made regarding our current insurance coverage which has been satisfactory to all our customers' requirements. We therefore have not included additional premiums, associated with higher limits, in our pricing for this proposal. Should our current limits be unacceptable to IPSC, and we must raise them for an IPSC contract, the difference in ABT's premium would be added and billed to IPSC at cost.

Article 6a: Workers Compensation/Employers Liability: (revised requirements)
beginning on 4th line, strike words beginning with "Voluntary" through end of this sentence.
Beginning 11th line, strike words beginning with "waiver of subrogation " through the end of this paragraph.

Article 6b: Commercial General Liability: (revised requirements)
Line 5 and 7 strike "$5 million", replace with "$2 million",
Line 6, strike words "and be specific for the contract",
Line 9, strike 'IPSC's", replace with "standard",
Beginning on Line 10, strike the words "or an endorsement of the policy acceptable to IPSC"'
Strike all of subparagraphs "(2)", "(3)", and "(5)".

Article 6c: Commercial Automobile Liability: (revised requirements)
Next to last line, strike words "as required" and replace with "revised requirements"

Article 6d: Professional Liability: (revised requirements)
2nd line strike words "with Contractual Liability included,",
4th line strike "$5 million", replace with $1 million",
Beginning on 5th line strike the entire sentence beginning with "Evidence", replace with "Such insurance may be an endorsement to the Commercial General Liability Policy without separate aggregate."

Article 6e: Other Conditions: (revised requirements)
Strike entire subparagraph (1)
In subparagraph (2) Line 2 insert the word "revised" between the words "these" and "insurance".

6.8 DIVISION F2, DETAILED SPECIFICATIONS - DETAILED REQUIREMENTS

Article 5e: ABT supply includes two thermocouples, each with its own terminal block head mounted on the burner windbox cover plate. The heads will have a removable cover for IPP access to terminals for remote temperature indication of fuel injector tip and barrel.

Article 5l: ABT supply includes one port per burner assembly with observation glass to view flame. Each port will be equipped with purge air connection and ball valve should the need arise to purge the view pipe.

7.0 The Opti-Flow™
Low NO_x Burner

7.0 The Opti-Flow™ Low NO_x Firing System

Advanced Burner Technologies' Opti-Flow™ low NO_x burner, which contains the fuel injector and dual register, is installed as a "plug-in" module. The existing burner throat opening in the water wall is used, as are the present support rails. In addition, we maintain the same opening in the windbox. No pressure part modifications or windbox modifications are required. All components are shop installed including the airflow elements, associated tubing and fittings.

ABT has developed an elbow-based fuel distribution system, which yields nearly uniform distribution of coal at the burner tip. These components are installed in the existing ceramic lined sweep elbow. All of the wear surfaces of these components are protected with ceramic wear materials.

Since its conception, ABT has constantly striven to produce a better Low NO_x combustion system. We consider all aspects of the system from combustion products (low NO_X, CO, & LOI), the effects on the furnace (slagging, fouling, and water wall corrosion), and the cost both from the purchase price to the O&M budget. We take seriously comments from the customer, the installation labor, and operational difficulties. As part of this effort, we have continually simplified the burner, both the register and the fuel injector.

7.1 Opti-Flow™ Low NO_x Burner

a) Fuel Injector Sub-Assembly

The fuel injector, a novel ABT Opti-flow™ design with a segmented nozzle and a fuel distributor, is made from highly wear resistant ceramic components, mounted in the elbow.

There are no internal devices in the fuel injector, other than the flow distribution devices in the elbow, that could cause coal layout or require periodic maintenance.

The components and their functions are briefly described as follows:

- Flow Distributor: A fuel distribution device in the elbow breaks the rope formed in the coal piping in order to provide uniform fuel distribution at the nozzle. A more complete discussion, "Opti-Flow™ Distribution System for Elbow-Based Fuel Injectors", is contained in section 7.2.

- Opti-Flow™ Low NO_x, Flame Stabilization Nozzle: This is the key element for attaining excellent flame stability and minimum NO_x. Figure 7.1, shows the segmented coal nozzle, which has an open design with no obstructions to collect coal. Pressure drop is low, and there are no components in the coal path that are subject to wear, coal accumulation or coking. Excellent flame

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stability is achieved due to the external flame stabilizers surrounding each segment.

- Inner Air Zone Swirler: This fixed vane swirler is attached to the outer barrel of the fuel injector. The position of the swirler is fixed and no adjustments are required.

A schematic of the Opti-Flow™ dual register is shown in Figure 7-2.

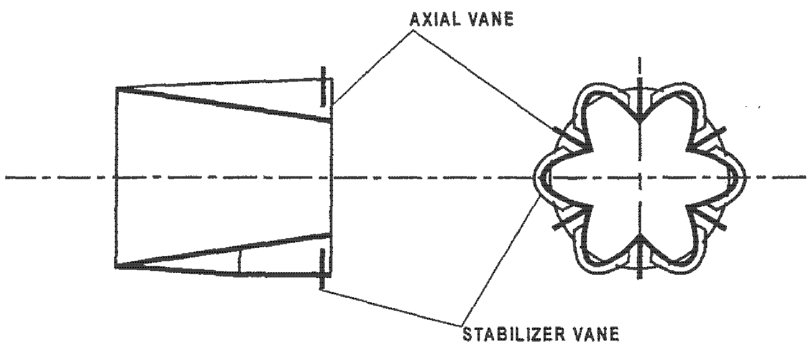

Figure 7.1 Opti-Flow™ Coal Nozzle

b) Opti-Flow™ Dual Register Assembly

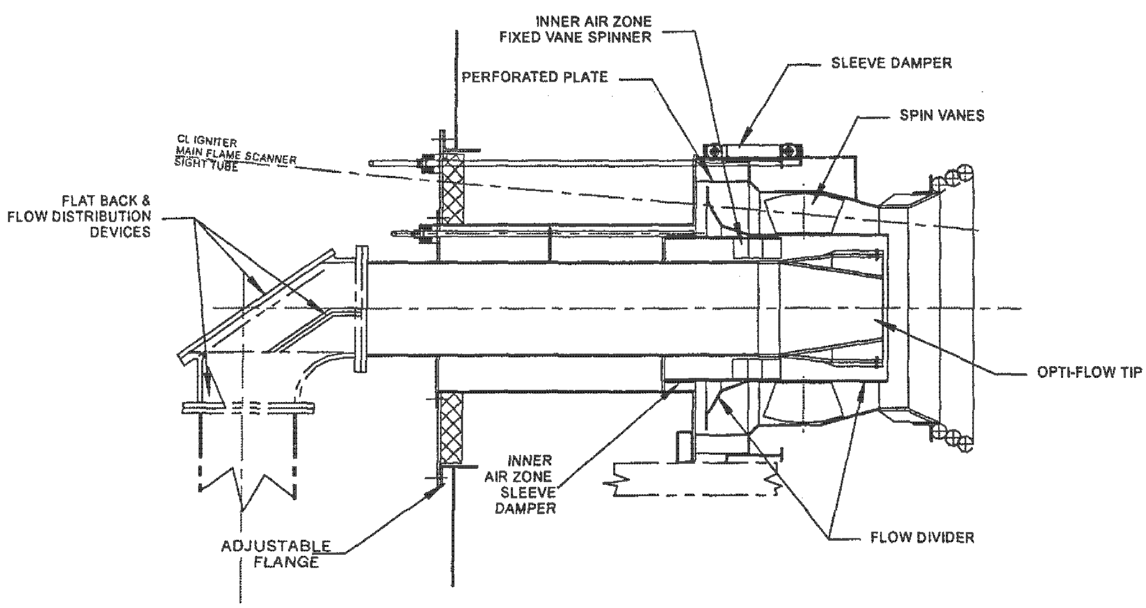

Figure 7.2 Opti-Flow™ Dual Register Assembly

Key features of the Opti-Flow™ dual register sub-assembly include:

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- Sleeve Damper: Air flow to each burner is controlled by a manually operated sleeve damper. This damper is used to balance the air flow between burners. The vanes are manually adjustable from the burner front to optimize the secondary air swirl in the outer zone.

- Inner Air Zone Damper: The sleeve damper is axially adjustable to vary the ratio of airflow between the inner air zone and the outer air zone. This is a manual adjustment made during optimization.

  Mechanically the damper is very simple. Because of its smaller size and weight, it rides on two stainless steel rods and is actuated by a push/pull rod. It is welded to the actuator rod to prevent any cocking of the sleeve.

- Outer Spin Vanes: The vanes are manually adjustable from the burner front to optimize the secondary air swirl in the outer zone. The actuator is two manually operated push/pull rods, which translate a "bull ring", moving linkages which rotating all of the spin vanes. This system has no components subject to binding by ash deposits and has little hysteresis.

- Low pressure drop register: The register has been designed for low pressure drop by the addition of turning vanes in the outer air zone and lower velocities in the spin vane section.

- Burner front plate flange: Flange adjusts to accommodate distortions in the windbox plate and it allows the burner throat casting to be located in the throat, regardless of furnace wall or windbox location. The bolted joint can be convenient, in the future, for removal of the burner module for maintenance.

7.2 Opti-Flow™ Fuel Distributor

Unbalanced fuel distribution leaving the coal nozzle tip and the resultant operating problems are caused by similar deficiencies in all pulverized fuel injectors. Coal is separated from its carrier (primary) air inside the inlet device, be it scroll, elbow, or 90° turning head, resulting in "roping" of the coal inside the primary stream. Redistributing the "rope" downstream of the inlet has been an inherent problem with burner designs. ABT's method of improving fuel distribution consists of a system of several interrelated components.

Advanced Burner Technologies has developed an elbow-based fuel distribution system, which yields nearly uniform distribution of coal at the burner nozzle's exit. This system reduces the fuel imbalance that occurs in standard elbow-based fuel injectors by a factor of approximately 4.5 to 1; and by over 3 to 1 as compared to other types of burner inlets (i.e., scrolls or t-type heads). Figure 7-3 illustrates the results of our two-phase physical flow modeling with a standard 90°-flatback elbow. The distribution system is also designed to accommodate sweep elbows.

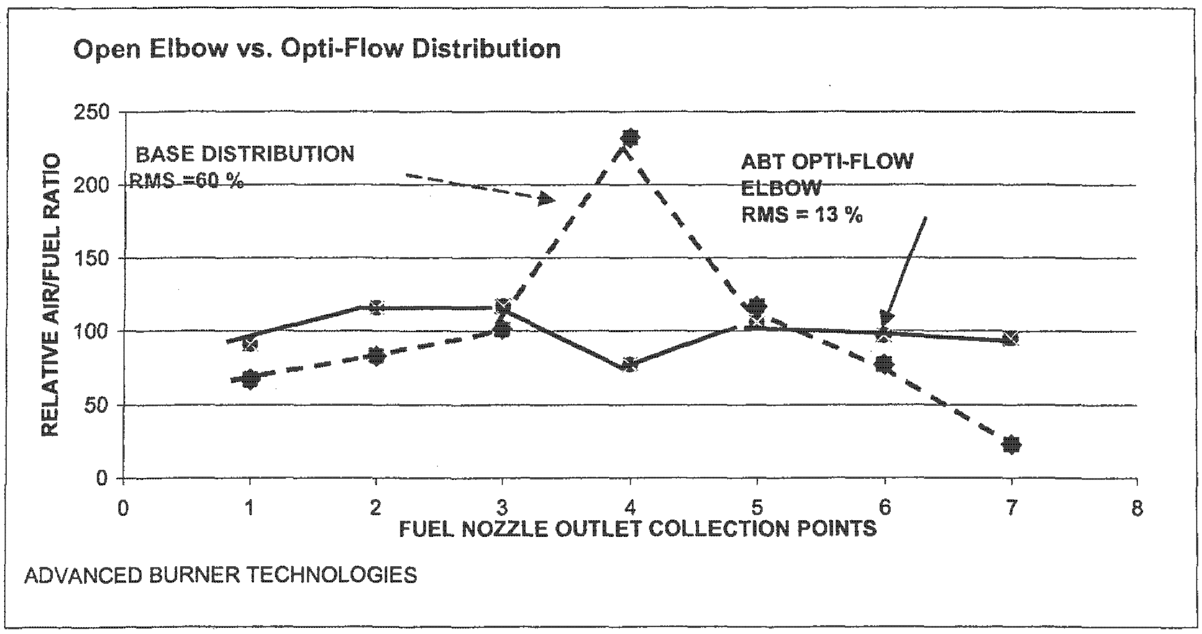

Figure 7.3 Comparison of Open Elbow and Opti-Flow™ Distribution

Baseline testing was performed with an open elbow and fuel nozzle in order to determine the uncontrolled distribution of particles at the outlet of the nozzle. A seven-point collection matrix was used: six points around the circumference and one collection point on the axis. As expected, the fuel distribution was severely unbalanced with an RMS value of 60% of the mean. The Opti-Flow™ modifications resulted in a significant improvement. The RMS value was reduced to 13% of the mean - an improvement of 4.62 over the baseline. Existing elbow-based fuel injectors that contain conical diffusers suffer from fuel imbalances of 36% RMS. In this case, the Opti-Flow™ system yields a 3 to 1 improvement in fuel distribution.

Severe fuel imbalance can result in the following problems:

- High-unburned carbon
- Long flames
- Flame instability problems.
- NO_x control problems

The significant improvement in fuel distribution provided by the Opti-Flow™ system will correct these problems to the extent that they are caused by fuel imbalance within the coal nozzles. Other fuel distributors cause coal "ropes" to impact on the coal nozzle and, thereby, reduce the nozzle's usable life. In the ABT design, all wear is limited to the wear-resistant devices in the elbow
The Opti-Flow™ system eliminates coal ropes and produces a nearly uniform fuel/air mix with axial flow downstream of the elbow. Therefore, the only erosion-prone areas will be located within the elbow. These areas will be lined with erosion-resistant materials and will be easily replaceable when necessary. A further advantage of this fuel distribution system is that, when used in conjunction with the Opti-Flow™ segmented nozzle, NO_x can be reduced compared to existing nozzles used for tangential firing.

The Opti-Flow™ Fuel Distribution System consists of:

1. The existing coal elbow with ABT's distributor vane package installed to break the coal rope formed in the fuel piping. All surfaces, including the leading edges are protected with ceramic tile.

2. A ceramic device at the coal elbow inlet will be used in conjunction with distributor vanes for equalizing coal flow to the tip.

7.3 IMPLICATION FOR FIELD RESULTS

Within a flame of a low NO_x burner, poor fuel distribution around the nozzle's circumference results in degraded emissions and efficiency performance. Optimal combustion - minimum NO_x and minimum unburned carbon, simultaneously - occurs when the circumferential fuel distribution is uniform (assuming primary air and secondary air distribution are also uniform). When this condition exists, the environment surrounding all fuel particles is the same and, therefore, results in uniform combustion conditions.

IP7020731

However, in practical operation, there are several conditions both external and internal to the fuel injector that precludes uniform fuel distribution. As a result, this prevents uniform air/fuel (stoichiometric) conditions within any flame from being attained.

Externally, non-uniform fuel flow inside the coal pipe, upstream of the fuel injector's inlet, causes imbalances further downstream within the fuel injector.

Internally, all burners, regardless of inlet type, develop unbalanced coal flow that yields wide variations in stoichiometry within the flame. Stratification that causes high fuel flow will result in very low stoichiometric zones in the flame. On the other hand, stratification that causes low fuel flow will result in very high stoichiometric zones in the flame. The former generates high-unburned carbon levels; the latter generates high NO_x levels.

Since both unburned carbon and NO_x generation are non-linear functions of oxygen availability (stoichiometry), the high and low stoichiometric portions of the flame do not compensate each other for their respectively high NO_x/low UBC and low NO_x/high UBC levels. The consequence of this effect is that the unbalanced flame generates NO_x and UBC levels that can be significantly higher than anticipated.

Table 7-1 compares the minimum and maximum relative fuel flows of the Base-Std OEM design and the Opti-Flow™ design to perfectly balanced conditions. The resultant local flame stoichiometries and relative effects on NO_x and UBC levels are also tabulated.

TABLE 7-1
Standard vs. Opti-Flow™ Burner:
Effect of Fuel Imbalance on Relative NO_x & UBC

Condition	Fuel Flow (Relative)	Local Flame Stoichiometry	Relative NO_x	Relative UBC
Base-Std	Min. 0.61 Max. 1.59	1.97 0.75	>>1.0 <1.0	<1.0 >>1.0
Opti-Flow™	Min. 0.90 Max. 1.22	1.33 0.98	1.0+ 1.0-	1.0- 1.0+
Perfect Balance	1.0	1.2*	1.0	1.0

*Assumes 20% excess air operation (stoichiometry = 1.2)

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Based upon these comparisons, it is reasonable to predict that, all other operating parameters and conditions being equal, the Opti-Flow™ low NO_x fuel injector will produce lower NO_x and lower Unburned Carbon than a standard burner.

Field retrofits on large utility boilers have confirmed this analysis: NO_x has been reduced 40% below the levels attained with the OEM's burner, while unburned carbon has not been increased.

IP7020733

210,000 lbs/hour Email

11

From: "joel" <joel@advancedburner.com>
To: "Phil Hailes" <Phil-H@ipsc.com>
Date: Thu, Sep 11, 2003 12:52 PM
Subject: Re: PA Mass Flow

OK: You initially had lb/hr I did know if that was a typo or just the wrong number.

We'll use 210,00 lb/hr as the design flow for the fuel injector sizing.

Thanks,

When do you need the dwg info you asked for?

----- Original Message -----
From: "Phil Hailes" <Phil-H@ipsc.com>
To: <joel@advancedburner.com>
Sent: Thursday, September 11, 2003 2:04 PM
Subject: Re: PA Mass Flow

> 3500 lbs/min is the average rate that Unit 1 at 950 MW is running at
> today with 7 mills. What specified condition are you requesting?
>
> >>> "joel" <joel@advancedburner.com> 9/11/2003 12:08:23 PM >>>
> Phil: this number is not correct. PA flow for mills of this size is in
> the
> 100,000's lb.hr per mill.
>
> It is not an approximate value we need; but the actual quantity under
> the
> specified condition.
>
> Please recheck this.
>
> Joel
>
>
> ----- Original Message -----
> From: "Phil Hailes" <Phil-H@ipsc.com>
> To: <joel@advancedburner.com>
> Sent: Thursday, September 11, 2003 12:25 PM
> Subject: PA Mass Flow
>
>
> > At 950 MW with 7 mills, the PA mass flow is approximately 3,500
> lbs/hr
> > per mill.
> >
> > >>> "joel" <joel@advancedburner.com> 9/10/2003 1:16:18 PM >>>
> > Phil:
> >
> > We need ASAP the following:
> >
> > What is the primary air flow per mill with the boiler at full load

12

> with
> > 7 mills in service? This value will set our nozzle sizing..
> >
> >
> >
> > Joel Vatsky
> >
> >
> >
>
>

CC: "Onaitis, Chuck" <Chuck@advancedburner.com>, "Ferrara, Sal N." <Sal@advancedburner.com>

- **NO_x shows only a slight dependence on BZLR for boilers with ABT low NO_x burners. The BZLR for Intermountain is similar to Deseret, which show NO_x emissions of 0.35. This data indicates that a NO_x level of 0.33 is attainable for Intermountain at 15% excess air and OFA ports closed.**

2.2 Opti-Flow™ Low NO_x Burner:

ABT's Opti-Flow™ low NO_x burner generates a very bright, intense flame that does not look like the classical low NO_x flame: its intensity is more akin to that of classical turbulent burners. Yet, the NO_x levels are typically more than 35 percent lower than those generated by competitors' low NO_x burners that ABT has replaced firing bituminous coal and more than 40% lower than those firing PRB. This NO_x reduction result has been attained without any additional UBC penalty.

The Opti-Flow™ low NO_x, flame stabilization nozzle is the key element of the fuel injector for attaining excellent flame stability along with minimum NO_x. Excellent flame stability is achieved by incorporating external flame stabilizers surrounding each nozzle segment. The segmented coal nozzle has an open design with no obstructions to wear or to collect coal. Nearly uniform fuel distribution around the burner nozzle circumference is also obtained, which provides significant aid in attaining minimum NO_x and UBC simultaneously. Pressure drop is minimal and there are no components in the coal path that would be subject to wear, coal accumulation, or coking.

Advanced Burner Technologies utilizes high quality stainless steels for all parts of the fuel injector that face the furnace, as well as stainless steel castings for all complex parts. The result is high reliability and excellent longevity of the burners.

ABT's Opti-Flow™ dual register is an innovative design that provides the operator with the flexibility of optimizing inner and outer zone swirl values, and the air flow split between the inner and outer zones independently of swirl. This is accomplished with a manually adjustable inner air damper and represents a significant improvement over other dual register designs. A fixed vane swirler is attached to the outer barrel of the fuel injector to impart swirl to the inner air zone.
In order to be most effective, any low NO_x burner must operate in an external environment that provides proper conditions needed for optimal combustion at each burner. There are two operational areas that are extremely important for best burner performance with minimum flame length:

a) Known and accurately controlled primary air flow along with other sources of air which enter the fuel injector: such as auxiliary air and seal air. ABT has sized the fuel injector proposed here based on the PA flow contained in the OEM mill curves for Intermountain Unit 2. ~~This primary air flow must be verified during pre-retrofit testing.~~

IP7020737

b) ~~PA/coal flows between burners must be as balanced~~ as possible. Significant imbalances in either ~~PA or coal flows~~ will yield:

- Longer flames on some burners.
- High NO_x from the burner with low fuel flow
- High UBC from the burner with high fuel flow
- High windbox pressure caused by an attempt to force an excessive amount of air to the high fuel burners.

This problem is generated by both unequal coal pipe lengths (resistance) and external mill stratifications. ABT's experience is that the proper use of adjustable coal pipe orifices can alleviate this problem to a considerable degree.

2.2.1 Fuel Injector for Intermountain Unit 2

The key components of the fuel injector include:

a) Fuel Distribution System: Flow enhancing fuel distribution system yields nearly uniform coal distribution at the burner nozzle. Uniform coal distribution helps to minimize NO_x and prevent significant increase in unburned carbon. This will be shop installed into the existing ceramic lined sweep elbows.

b) Low NO_x Opti-Flow™ Segmented Burner Tip: Cast stainless steel open coal nozzle with integral external flame stabilizers promotes internal fuel staging reactions which result in minimum NO_x, yet provide extremely stable, bright flames.

2.2.2 New ABT Opti-Flow Dual Registers with Fuel Injector

ABT's complete dual register, described in detail in Section 7, will be installed in combination with our fuel injector. The improvements in air flow control and operability will amplify the fuel injector's ability to control NO_x. Minimum NO_x with optimal flame shape should then be attainable. The ABT dual register design provides the following:

- Optimized secondary air flow to the burners (nearly equal total air/coal ratios) accomplished by adjustment of individual burner dampers.

- Independent control of secondary air swirls and flow distribution within the burner.

2.3 Analytical Evaluations

Airflow Sciences Corp (ASC) will develop a CFD model of Internountain's burner windboxes and duct work. ABT's experience is that the B&W compartmented

IP7020738

design Flowrate 4100 lb/min old B&W curves ⇒ 246,000 lb/hr
350 °F design Temp
-.5 "WC Boiler design static
design density @ measuring device 0.0449 lb/Ft^3

(75,000 cfm
using 4100 lb/min
150 °F outlet From curve

Static press 30"' WC
barometric press 25.21 "Hg

62,980 cfm calc
using 4100 lb/min outlet @

$$d = \frac{1.328\left(25.21 + \frac{30}{13.60}\right)}{350 + 460} = 0.0449 \text{ lb/Ft}^3$$ @ measuring device

From B&W Noel Moen, Don Dugan & Aug 1998 B&W letter

Base Air Flow 27 Ft^3 air/lb coal Full load only (68 TPH)

$$(27 \text{ Ft}^3 \text{ Air/lb coal})\left(68 \frac{\text{tons coal}}{\text{hr}}\right)(2000 \text{ lb/ton})(1 \text{ hr}/60 \text{ min}) = 61,200 \text{ Ft}^3/\text{min air}$$

$$d = \frac{1.328\,(29.92)}{150 + 460} = 0.0651 \text{ lb/Ft}^3$$ @ pulv outlet

$$(61,200 \text{ Ft}^3/\text{min air})(0.0651 \text{ lb/Ft}^3 \text{ air})(60 \text{ min/hr}) = 239,047 \text{ lb/hr outlet} = 3984 \text{ lb/min}$$

In controls 237,300 lb/hr @ 100%
3955 lb/min
65.9 lb/sec

Startup set points

$$(71,400 \text{ Ft}^3/\text{min air})(0.0651 \text{ lb/Ft}^3 \text{ air})(60 \text{ min/hr}) = 278,888 \text{ lb/hr} = 4648 \text{ lb/min}$$
77.5 lb/sec

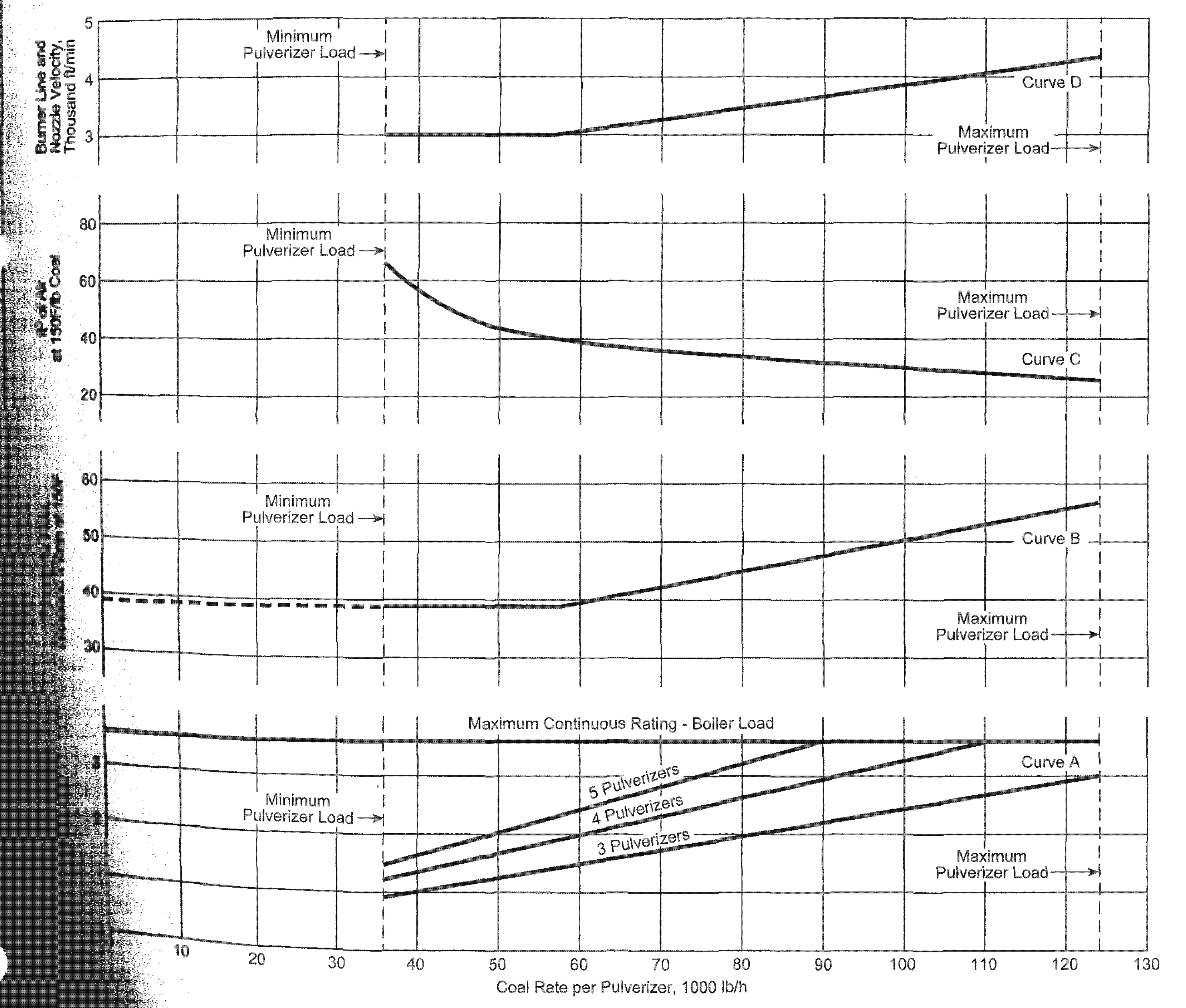
IP7020739

of pulverizer and system operation. The lower curve, labeled A, shows boiler steam flow versus coal output per pulverizer. The individual lines show the number of mills in operation. In this example, a full boiler load of 3.6×10^6 lb/h (454 kg/s) steam flow can be reached with five mills in service at about 89,000 lb/h (11.2 kg/s) each. The maximum load also can be reached with four mills at about 111,000 lb/h (14.0 kg/s) each. The maximum steam flow with three mills is just over 3.0 $\times 10^6$ lb/h (378 kg/s). The minimum load line shown is determined by Curve C. The indicated 36,000 lb/h (4.54 kg/s) is a very good turndown ratio, but the practical minimum may be higher based on ignition stability or the onset of mechanical vibration.

Curve B shows primary air flow at mill exit conditions. Maximum flow is 55,800 ft^3/min (26.34 m^3/s) for a B&W-89™N mill, corresponding to 124,000 lb/h (15.6 kg/s) coal flow. The minimum equipment design flow is approximately 65% of this or 36,300 ft^3/min (17.13 m^3/s). However, the exact minimum flow may need adjustment to permit stable burner operation. This is illustrated by 39,000 ft^3/min (18.41 m^3/s) minimum shown in Fig. 11, curve B, and the 3000 ft/min (15.2 m/s) minimum in curve D.

Curve C is the air/fuel ratio expressed in ft^3 of air per lb of coal. This ratio is critical to stable ignition at low loads and is influenced by coal rank and fineness. For this example, the maximum air to fuel ratio is 65 ft^3 air per pound fuel, typical of bituminous coal. Dividing the minimum air flow by this ratio establishes the minimum pulverizer load.

Curve D shows primary air velocity in the burner pipes versus pulverizer coal flow. This curve is plotted by dividing air volume at mill exit conditions by the total flow area of the pipes connecting the mill to the burners. The minimum velocity allowed is 3000 ft/min (15.2 m/s), at which the pulverized coal can be kept entrained in the primary air stream. The mini-



N pulverizer-burner coordination curves.

IP7020740

ATTORNEY-CLIENT PRIVILEGE/ATTORNEY WORK PRODUCT

F&C

MEMORANDUM

To: George Cross

From: FABIAN & CLENDENIN, P.C.

Date: November 6, 2006

Client: Intermountain Power Service Corporation (11915)

Matter: ABT Burner Dispute (031)

Re: **Preliminary Case Analysis and Settlement Negotiations Prep**

Issue and Short Answer

You have asked us to analyze the strengths and weaknesses of a potential lawsuit against ABT regarding the failed burners installed in 2004 in preparation for your meeting with ABT on November 8, 2006 in a final attempt to resolve this matter prior to proceeding with litigation. The assessment below is based on preliminary discussions with plant personnel as well as a preliminary review and assessment of a variety of documents received from plant personnel. This assessment presents a broad analysis for your strategic use and does not deal with the specifics of any given issue.

At this time, it appears that IPSC's potential case against ABT is strong. There would, however, almost certainly be factual disputes that would preclude a quick resolution of the case, say by summary judgment. The result is that legal fees and expert witness costs would be greater. The agreement with ABT makes no provision for either party to recover attorneys' fees. Thus, whatever IPSC spends in its recovery efforts will likely never be recouped. The agreement with ABT also precludes the recovery of indirect and consequential damages, meaning IPSC would only be able to recover its direct repair and replacement costs (e.g., parts and labor) that were necessitated by the failed burners. (We understand, however, that even just these direct costs could end up exceeding $2 million.) On the other hand, the prospect of complex, contracted, intrusive, and expensive litigation, along with the potential bad publicity, should be a significant incentive for ABT to settle. ABT may be more likely to settle given that it has recently been acquired by Siemens and because it may have professional liability (E&O) insurance covering this claim.

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In the end, the strength of the underlying claims and the amount at stake should form the basis of a solid demand from ABT at this time.

Discussion

I. Potential Claims Against ABT.

Based on our discussions and document review to date, we believe IPSC could bring, at a minimum, the following claims against ABT: (1) breach of express warranties in the agreement; (2) breach of warranties implied by law (i.e., merchantability and fitness for a particular purpose); (3) breach of contract; (4) negligence; (5) strict liability; and (6) negligent (or intentional) misrepresentation.

II. Strengths.

A. The Agreement.

The Agreement is favorable to IPSC in many ways. It creates several express warrantees and numerous duties to which ABT should have adhered. Some of the most significant are:

> ABT Proposal, Section 6.4, Part C, Div. C3, Bidding Documents – Additional Bid. Section 1. . . .
>
> g. There are no environmental limitations to the coal burners.
>
> h. The coal burners will slave to the mills. There are no special modes of operation.
>
> i. There are no special maintenance requirements. ABT suggests that, fly ash be cleaned from adjustable register components at the commencement of an outage if the boiler is to be water cleaned.
>
> j. There are no required boiler modifications to accommodate the new burners.
>
> Agreement, Part C, Div. C3, Section 1.g. Bid Submittal Requirements. Environmental limitations of burner and scanner hardware, including both airborne contaminants and heat. . . . ABT does not consider operation of its design in IPSC's boiler to have any environmental limitations: The Conditions are such that no material will operate anywhere near its limit. In fact, ABT has placed no such limitations on any retrofit ABT has done.
>
> Part C, Div. C3, Section 1.h. Bid Submittal Requirements. Available and recommended modes of operation for both the flame detection system and the burner system. . . . During normal operation, following optimization, further adjustments should not be necessary unless a significant change in fuel supply characteristics occurs. In no case has ABT required any customer to modify normal procedures to

accommodate its burners; however, as noted in the guarantee section, ABT does require good fuel balance in the coal pipes, accurate primary air flow measurement and control, and that the primary air flow decreases as mill load decreases. ABT does not consider these to be "special modes of operation"; rather good operation.

Agreement, Part D, Div. B1 Contract Documents Description. Contractor shall not be allowed to take advantage of any error, discrepancy, omission, or ambiguity in any document, but shall immediately report to the President and Chief Operations Officer, in writing, any such matter discovered. The President and Chief Operations Officer will then decide or correct the same and the decision will be final.

Agreement, Part E, Div. E1, Section 2. Materials and Work. All work shall comply with the Specifications. . . . All Work shall be done by qualified workers in a thorough and workmanlike manner that would pass without objection in both Contractor's trade and IPA's and IPSC's industry. Materials, equipment, workmanship, and other Work not definitely specified, but incidental and necessary for the Work, shall conform to the best commercial practice for the type of Work in question and be of a quality that passes without objection in Contractor's trade and IPA's and IPSC's industry.

Agreement, Part F, Div. F2, Section 5, Burner Design. Burners provided for use at IGS shall adhere to the following provisions:

a. Within the design phase of the Work, Contractor shall review all operational impacts on associated equipment and systems such as fans, pulverizers, dampers, etc. Any concerns regarding operating limitations or increase power demands noted within the modeling/design phase shall immediately be brought to the attention of the IPSC Contract Administrator. . . .

f. The burner assemblies shall be fabricated of quality material sufficient to withstand the significant thermal stresses occurring within the windbox as a result of both radiant and convective heating. Any deformation causing malfunction of register assemblies or misdirection of flow through the burner within the period of guaranteed operability shall be repaired at the earliest possible opportunity and charged to Contractor.

g. Experience-based and verified wear-life shall be quoted within the bid for all burner components. No component shall last less than four (4) years before requiring rebuild, restoration, or replacement. . . .

p. Burners shall be capable of stable operation continuously from 45 percent to 115 percent of rated BTU output of the burner without supplemental fuels.

Agreement, Part F, Div. F2, Section 8, Installation. . . .

c. Contractor shall be responsible for design and installation of any modifications required for interface with the existing coal pipes. This includes modifications to routing, size, and connection to the new burners.

d. Contractor shall be responsible for design and installation of any additions or modifications to windboxes, windbox supports, burner supports, waterwall tubing, buckstay system, etc., or any other existing system or piece of equipment required for proper and successful operation of the new burners and/or flame detection systems.

B. The General Factual Background.

Regardless of the specifics, the general factual background, which will form the basis of any lawsuit presented to a jury, supports IPSC's case against ABT. More particularly, the previous burners operated for well over a decade through a variety of operating conditions and with a variety of fuels and showed less degradation in that long period than ABT's burners experienced in a little over a year. Obviously something was wrong with either ABT's design, fabrication, or materials, all of which were in ABT's province.

C. The Costs of Litigation.

A lawsuit against ABT regarding the failed burners would likely be complex , protracted, expensive, and intrusive. Such a lawsuit obviously has significant nuisance value that would likely come into play in settlement discussions. The nuisance value could even be greater given ABT's recent acquisition by Siemens. We would seek to discover all of the details regarding this acquisition in an attempt to somehow make Siemens potentially liable. In all likelihood, Siemens and ABT would find this discovery quite intrusive and strenuously resist it.

At this time, we estimate that pursuing this case through trial could cost between $200-250K in attorneys' fees and costs and an estimated $100K-$200K in expert witness fees and costs (e.g., finite element analyst, metallurgist, design engineer(s), etc.). (If this matter proceeds to litigation, we will provide IPSC with a much more detailed budget, which would account for various tasks and set forth a projected timeline.) ABT would likely incur similar fees and costs in its defense, if not more (i.e., in the event it retained counsel from the East Coast).

D. Possible Insurance Coverage.

The Agreement, Part F, Div. F1, Section 6.d., Professional Liability, requires ABT to maintain "Professional Liability Insurance covering Contractor's liability arising from errors and omissions made directly or indirectly during the execution and performance of the Contract." The Agreement also requires that the policy not be subject to cancellation or nonrenewal. It is possible this insurance covers IPSC's claims. Getting a third-party insurer involved could speed up the recovery/settlement process. Of course, much depends on the policy language and the attitude of the particular insurer.

III. Weaknesses.

A. Factual Disputes and Increased Fees and Costs.

ABT will likely argue: (1) that IPSC failed to provide it with important information or provided the wrong information during the design phase; (2) that IPSC operated the plant outside of some of the design parameters specified in the Agreement (or Proposal documents, which, depending on the section/document, are likely to be found part of the Agreement); (3) that IPSC burned a significantly different amount of high ash, low BTU coal than "usual" during the relevant time period; and (4) that some combination of the aforementioned were the causes of the burner failure.

Although our preliminary discussions and analyses show that IPSC has a very good chance of prevailing against such arguments, there would probably be enough evidence to create factual disputes that would prevent summary judgment for IPSC. If push came to shove, IPSC would actually have to try some or all of these factual disputes before a jury. This means that IPSC's attorneys' fees and expert costs would likely be at the higher range of our estimate.

B. Virtually No Possibility of Recovering IPSC's Attorney's Fees and Costs.

Hand-in-hand with the aforementioned increased costs of litigation is the fact that the Agreement does not have a provision granting the prevailing party its attorneys' fees and costs. There are also very few statutory avenues for fee and cost recovery for this particular case. This means that IPSC will likely never recoup from ABT the money it spends litigating this case to finality. ABT knows this and will use this fact to its advantage in settlement discussions.

C. No Indirect or Consequential Damages.

The Agreement expressly forbids IPSC from recovering indirect and consequential damages:

> Part E, Div. E1, Section 13. Limitation of Liability: Responsible Party. . . . In no event shall Contractor be liable, whether in contract, tort (including negligence), warranty, strict liability, or any other legal theory, for any indirect or consequential damages, such as but not limited to: cost of capital; loss of anticipated profits or revenue; loss of use or increased expense of using equipment or plant; loss of power or production; cost of purchased or replacement power or production; or claims of customers for loss of power or production.

Thus, the most IPSC would be able to recover in any lawsuit would be its direct damages (i.e., the costs (labor and materials) of repairing and replacing the failed burners). We understand that these direct costs may exceed $2 million.

D. The Possibility of Multiple Causes.

IPSC would argue that ABT caused the burner failures through defective design, poor fabrication, or improper materials. ABT would argue that IPSC caused the burners to fail by not providing ABT with accurate or correct information, by operating outside of some of the design parameters specified in the Agreement, and by burning abnormally high ash, low BTU coal. A court or jury could, under Utah law, apportion fault among these various possible causes, meaning IPSC's recovery could be some percentage of its direct damages as opposed to all of its direct damages. Furthermore, proving causation in highly technical cases such as this is often a very expensive endeavor, requiring a variety of experts to show, for instance, that an improper design allowed for more rapid erosion or for higher thermal stresses that ultimately led to failure.

E. The Limited Remedies of the Express Warranties.

The various warranties set forth in the Agreement, in general, expressly limit the remedies to having ABT repair or replace the faulty materials. In other words, arguably, the breach of warranty claims do not form a basis for a monetary remedy from ABT. These warranties and limitations, however, should not limit IPSC's rights and remedies under the other theories.

F. Some of the Requirements of the Proposal (Arguably the Agreement).

ABT's Proposal, and thus arguably the Agreement, sets forth some express mill and fuel conditions on which ABT based its burner warranties. Specifically:

- **Mill Performance:**

  Air Flow: The low NO_x burners will be designed to slave to the mills' operation in that the fuel injector will be sized to follow the mills' primary air flow characteristic. Consequently, ABT will design the burners for the full load primary air flow, per mill, as per the OEM mill curves, with one mill out of service at boiler full load. Primary air flow must reduce as mill load decreases. PA flow will be determined during pre-retrofit testing defined in this proposal Section 2.4.

  Coal/PA Flow Balance: The balance between coal pipes within a given mill is to be within ±10% of the mean for that mill. (ABT recognizes that this is difficult to accomplish on all mills. Consequently, we will accept one of the eight mills being outside this range, to maximum of ±15%).

- **Fineness:** 99.5% < 50 Mesh and 70% < 200 mesh; all mills simultaneously.

- **Coal Properties:** Western U.S. bituminous: HHV > 11,500 Btu/lb; $N_2 \leq 1.2\%$; FC/VM ≤ 1.2; Ash ≤ 12%

Our preliminary assessment indicates, as you know, that the Station burned a significant amount of high ash coal (far in excess of 12% ash) during part of the relevant time period. We are unsure, at this time, the extent to which IPSC complied with the other listed "conditions." ABT would almost certainly argue that failure to comply with all of these requirements absolves ABT of all liability. We should be able to make a good argument, though, that these "conditions" relate only to the express warrantees of this section and not to other warranties or other causes of action.

V. Some Strategies for Settlement.

- The parties have been arguing the details of their disagreement in numerous letters and meetings over the past year. There is no need to rehash these details again, except perhaps to clarify any remaining uncertainties. Doing so would simply make the discussions more contentious. Instead, the focus should be on how and by whom the problems will be remedied and how the repair costs *will* (as opposed to *should*) be split.

- IPSC's position should be that, if there is no immediate settlement, there will be litigation in the very near future. Show strength, but with a smile.

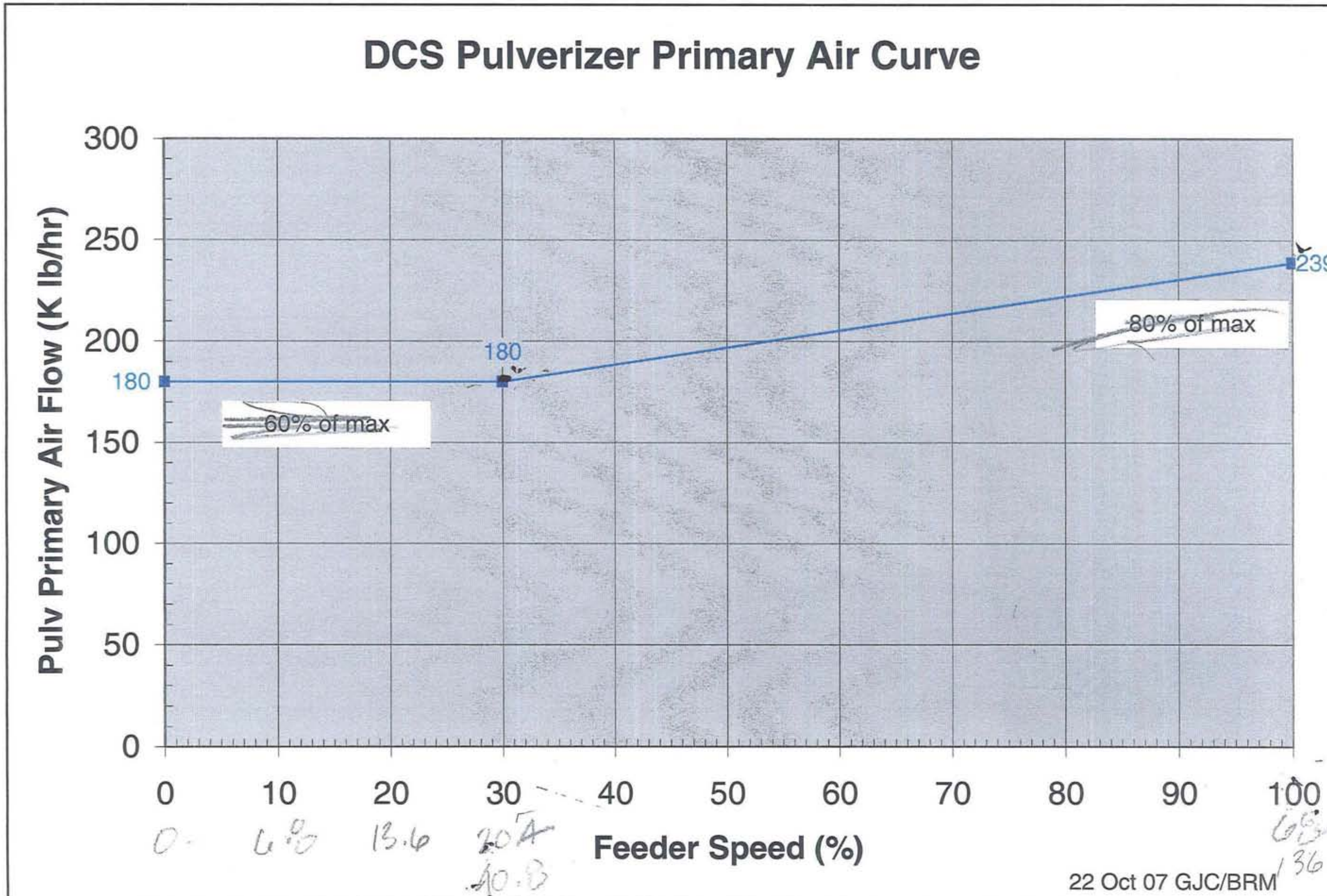
- If ABT does not make a substantive settlement offer, consider parting ways for now and beginning the litigation process. ABT and Siemens will likely find the discovery process expensive, burdensome, and intrusive, which would likely increase your leverage in settlement talks. The key, yet difficult to answer, question is whether the costs of litigating to that point will be less than the increased amount of any settlement offer.

- Be sure to open the meeting with a statement that these are settlement negotiations. That way, most, if not all, of what is said and exchanged during that meeting will be inadmissible in any subsequent trial.

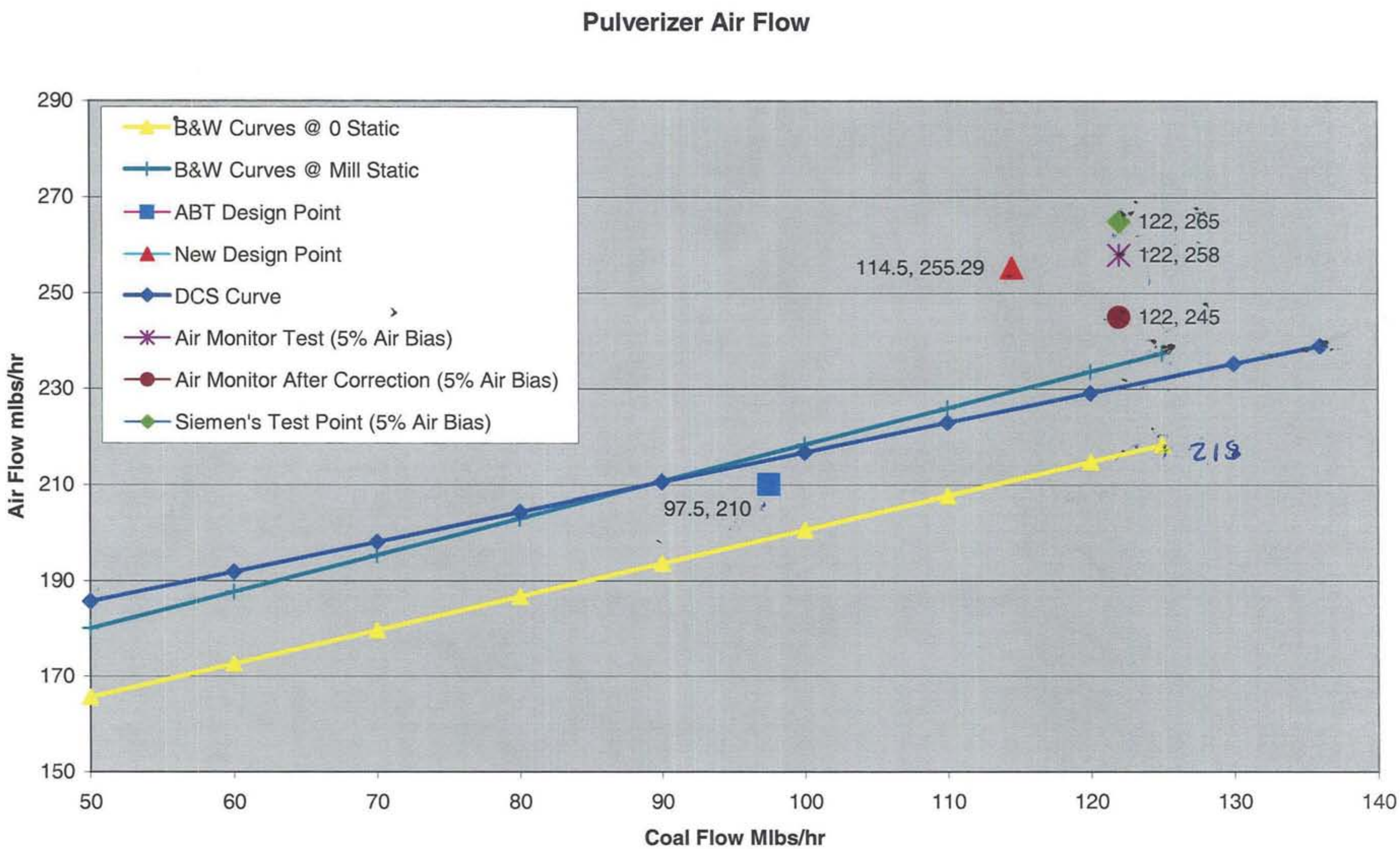
VI. Our "Disclaimer."

Predicting the outcome of potential litigation is difficult, because many of the details are unknown to us, and even to IPSC. The conclusions herein are preliminary and based on limited access to documents, limited knowledge of many of the facts that may ultimately be presented at trial, and limited time to fully evaluate the issues. Nevertheless, sufficient information exists to reach the conclusions indicated above, and the conclusions are warranted by the facts as we understand them and the law as we have determined by our research to this point.

ND: 4829-2346-5473, Ver 1


DCS Pulverizer Primary Air Curve
Pulv Primary Air Flow (K lb/hr)
300
250
200
150
100
50
0
180
180
239
60% of max
80% of max
0
10
20
30
40
50
60
70
80
90
100
Feeder Speed (%)
22 Oct 07 GJC/BRM

IP70200748


Pulverizer Air Flow
B&W Curves @ 0 Static
B&W Curves @ Mill Static
ABT Design Point
New Design Point
DCS Curve
Air Monitor Test (5% Air Bias)
Air Monitor After Correction (5% Air Bias)
Siemen's Test Point (5% Air Bias)
122, 265
122, 258
114.5, 255.29
122, 245
218
97.5, 210
Air Flow mlbs/hr
Coal Flow Mlbs/hr
290
270
250
230
210
190
170
150
50
60
70
80
90
100
110
120
130
140

IP7020749

Babcock & Wilcox
a McDermott company

Power Generation Group
3535 S. Platte River Drive
Unit G-3
Sheridan, CO 80110
(303) 761-3388
FAX: (303) 761-1219

August 13, 1998

Mr. Gary Christensen
Intermountain Power Service Corporation
850 West Brush Wellman Road
Delta, Utah 84624

Re: MPS-89G Standards
RB-614/5

Dear Gary,

After our telephone conversation today, I thought it would be appropriate to follow up on a few of the items we discussed. As you know, the 16 B&W pulverizers at your plant are the MPS-89G. The base standard design for this model is as follows:

Base Capacity as Fired (tons/hr) (70% thru 200 mesh, 50 HGI)	68	
Base Air Flow (lbs/hr) (27 cu.ft. per lb of coal, full load only)	239,000	237300
Base Outlet Air Flow (cfm) (150° F, 30 in HG)	61,200	
Grinding Table Speed (rpm)	25.5	
Diameter of Rolls (inch)	70	
Width of Rolls (inch)	24	
Seal Air Requirements (lb/min)	137.3	

If you have any further questions, please feel free to contact me.

Sincerely,

BABCOCK & WILCOX COMPANY

Robert W. Wewer
District Engineer

RWW:dz/847
cc: J.B. Doyle, Denver Sales

[illegible]. 7
4.3

22.2
+14.7
≃ 40 IN MILL PRESSURE

21.8
253

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